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SKULL MORPHOMETRICS OF LASIORHINUS LATIFRONS (OWEN 1845) (MARSUPIALIA : VOMBATIDAE)

BY G. G. SCOTT, K. C. RICHARDSON & C. P. GROVES

Summary

Skull morphometrics do not support the splitting of *L. latifrons* into two subspecies, one at each end of its geographic range. Measurements of wombat skulls from the Blanchetown region in the east of South Australia to Nullabor Station, approximately 1000 km to the west, do not show any clinal variation. Analysis of wombat measurements from intermediate geographic locations show little variation of the homogeneity within *L. latifrons* over its entire geographic range.

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SCOTT, G. G., RICHARDSON, K. C. & GROVES, C. P. 1989. Skull morphometrics of *Lasiiorhinus latifrons* (Owen, 1845) (Marsupialia: Vombatidae). *Rec. S. Aust. Mus.* **23**(1): 1-5.

Skull morphometrics do not support the splitting of *L. latifrons* into two subspecies, one at each end of its geographic range. Measurements of wombat skulls from the Blanchetown region in the east of South Australia to Nullarbor Station, approximately 1000 km to the west, do not show any clinal variation. Analysis of wombat measurements from intermediate geographic locations show little variation of the homogeneity within *L. latifrons* over its entire geographic range.

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South Australian hairy-nosed wombat taxonomy began in 1845, when Owen (1845) exhibited the skull of a wombat at a meeting of the Zoological Society of London. He named the new species *Phascolomys latifrons*. Owen (1849) gave a more detailed account in the Society's transactions of 1849, but the wombat's external anatomy remained unknown. Twelve years later Angas (1861) suggested a conspecificity between Owen's species and a wombat at that time living in the Adelaide Zoo. This suggestion was rejected by Gray (1863) because Owen had based his description of *P. latifrons* on a single skull. Gray subsequently created a new species, *P. angassii*, for the Adelaide Zoo wombat. Gray (1863) also rejected Gould's (1863) published plates of what he thought Owen's *P. latifrons* might look like based on a large common wombat skin sent to the British Museum from South Australia. Gray named the skin *P. setosus*. Subsequently Gould (1863) named the hairy-nosed species, featured in another of his plates, *P. lasiorhinus*. Gray (1863) also disagreed with Gould's *P. lasiorhinus* for he added the name *Lasiiorhinus m'cayi* to the taxonomic miasma. South Australian hairy-nosed wombat taxonomy was finally resolved when the skull of the animal described by Angas (1861) was shown to be a specimen of *P. latifrons* Owen (Murie 1867).

A distinction between the hairy-nosed wombat and the common wombat was made by Wood Jones (1924) who split the genus *Phascolomys* into *Lasiiorhinus* Gray 1863, the hairy-nosed wombat, and *Vombatus* Geoffroy 1803, the common wombat, on the basis of skeletal and external differences.

South Australian hairy-nosed wombat taxonomy was resurrected over a century later when Crowcroft (1967) hinted that there might be more than one subspecies of *L. latifrons*, one at each end of its known geographic range i.e. Portree in the east, and

Nullarbor Station in the west. Although presenting an important zoogeographic question, no attempt has since been made to resolve Crowcroft's observation.

MATERIALS AND METHODS

Specimens

Skulls of *Lasiiorhinus latifrons* from their entire geographic range in South and Western Australia were examined in the collections of the South Australian Museum and British Museum (Natural History). Additional specimens were collected at Blanchetown, Roonka and Swan Reach in South Australia.

Measurements

Although both adult and juvenile specimens were examined for this study, osteological measurements were made, by vernier calipers, on adults only i.e. on skulls in which all cranial sutures were closed, and all teeth fully erupted.

Skull Measurements

1. Skull length; distance from the most rostral point of the incisive bones to the most caudal point of the parietal bones.
2. Bitemporal breadth; distance across the temporal bones, rostral to the mastoid process and caudal to the squamous root of the zygomatic.
3. Frontal length; measured along the midline from the frontonasal suture to the coronal suture.
4. Bimalar breadth; distance across the malar bones opposite the maxilloincisive suture.
5. Nasal length; distance along the midline from the most rostral point of the nasals to their junction with the frontonasal suture.

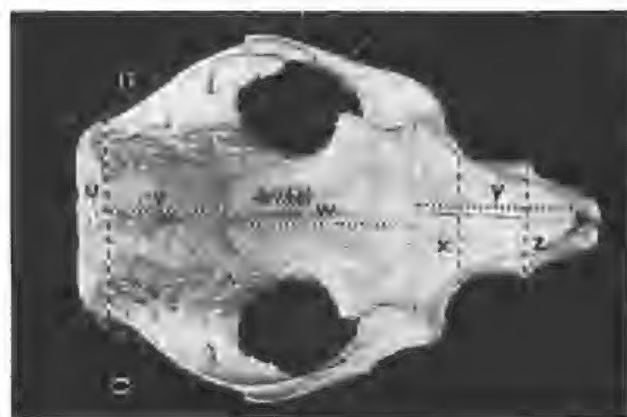


FIGURE 1. Some of the skull measurements used on the skulls of *L. latifrons*. This specimen was collected from Kyancutta, S.A. u, bitemporal breadth; v, length from the coronal suture to the lambdoidal suture; w, frontal length; x, bimalar breadth; y, nasal length; z, bi-incisive breadth.

6. Bi-incisive breadth; distance between the nares.
7. Bizygomatic breadth; distance across the skull between the lateral surfaces of the zygomatic bones.
8. Combined upper incisor alveolar breadth.
9. Upper diastema length.
10. Mandible length; distance from the most rostral point of the incisor alveoli to the most caudal point of the condyloid process.

Osteological terminology used is as in the 'Nomina Anatomica Veterinaria' (Habel *et al.* 1983).

Analysis

Student's *t*-test, 2-sided and bivariate regression analysis (Simpson *et al.* 1960), and Coefficient of Difference analysis (Mayr 1969) were used. As bivariate regression analysis showed no significant sexual dimorphism for any skull character, measurements of both sexes were combined.

SYSTEMATICS

Lasiurus latifrons (Owen 1845)

1845 *Phascologomys latifrons* Owen. South Australia.

1863 *Phascologomys angassii* Gray. South Australia.

1863 *Phascologomys lasiorhinus* Gould. South Australia.

1863 *Lasiurus m'coyi* Gray. South Australia.

Holotype

Lasiurus latifrons, British Museum number 46.338, skull, subadult, South Australia. No specific location given.

Description

Cranium: frontals long; nasals short with straight

tips; nasals bend before rostral surface of incisives; incisive process reduced to a tubercle; frontonasal suture has a rostrocaudal amplitude of 0.5–1.0 mm; cranial vault is convex; occiput at the nuchal crest is concave; there is no parietal pit; there is no process on the medial surface of the mandibular fossa.

Mandible: articular surface is short and does not overhang the inflected angle; rostral origin of the ascending ramus is opposite the third and fourth molar teeth; condyloid process has a deep fossa on the rostral surface; masseteric fossa is shallow.

Dentition: premaxillary incisor, occlusal surface is short. Mandibular incisor, occlusal surface is elongate. Maxillary premolar, occlusal surface is elongate, there is a longitudinal mesiolingual groove approximately 1 mm wide. Mandibular premolar, occlusal surface is quadrate. Mandibular molars, have a shallow groove on the distal surface of the 1st molar and mesiovestibular surface of the 2nd, 3rd and 4th molars.

Distribution

The specimens were grouped on their geographic origin as coming from eastern, central and western regions. The eastern region included specimens from the Murray Valley and Yorke Peninsula. The central region had specimens from Eyre Peninsula and west of Lake Harris to Fowlers Bay. The western region consisted of specimens from Yalata to Caiguna extending north to the Transcontinental Railway (Marlow 1965, Lowry 1967, Wells 1968, Conquest 1969, Aitken 1971, Mellroy 1973).

ANALYSIS

Metric differences

Pooled measurements for wombats from their eastern distribution differ from those from their western distribution. Using mean and range values in millimetres they are on average larger in skull length; 163.3 (149.6–175.6) v. 162.4 (150.5–175.7) and frontal length 63.0 (58.6–68.9) v. 59.9 (58.4–61.5).

Their mean values show their bimalar breadth to be 47.9 (41.5–54.0) v. 51.2 (45.6–55.9), bitemporal breadth 64.2 (57.2–70.7) v. 72.7 (67.5–78.3), bi-incisive breadth 38.3 (33.9–41.8) v. 39.2 (37.7–41.0), upper diastema length 38.3 (34.5–43.5) v. 39.7 (35.5–43.7) and mandible length 120.4 (111.2–128.7) v. 122.1 (113.2–129.0). The means of eastern wombats are all smaller.

Bivariate regression

On the basis of cranial characters (Figs 3–4), Nullarbor wombats generally have mean values larger than those of the eastern animals for bitemporal breadth relative to skull length.

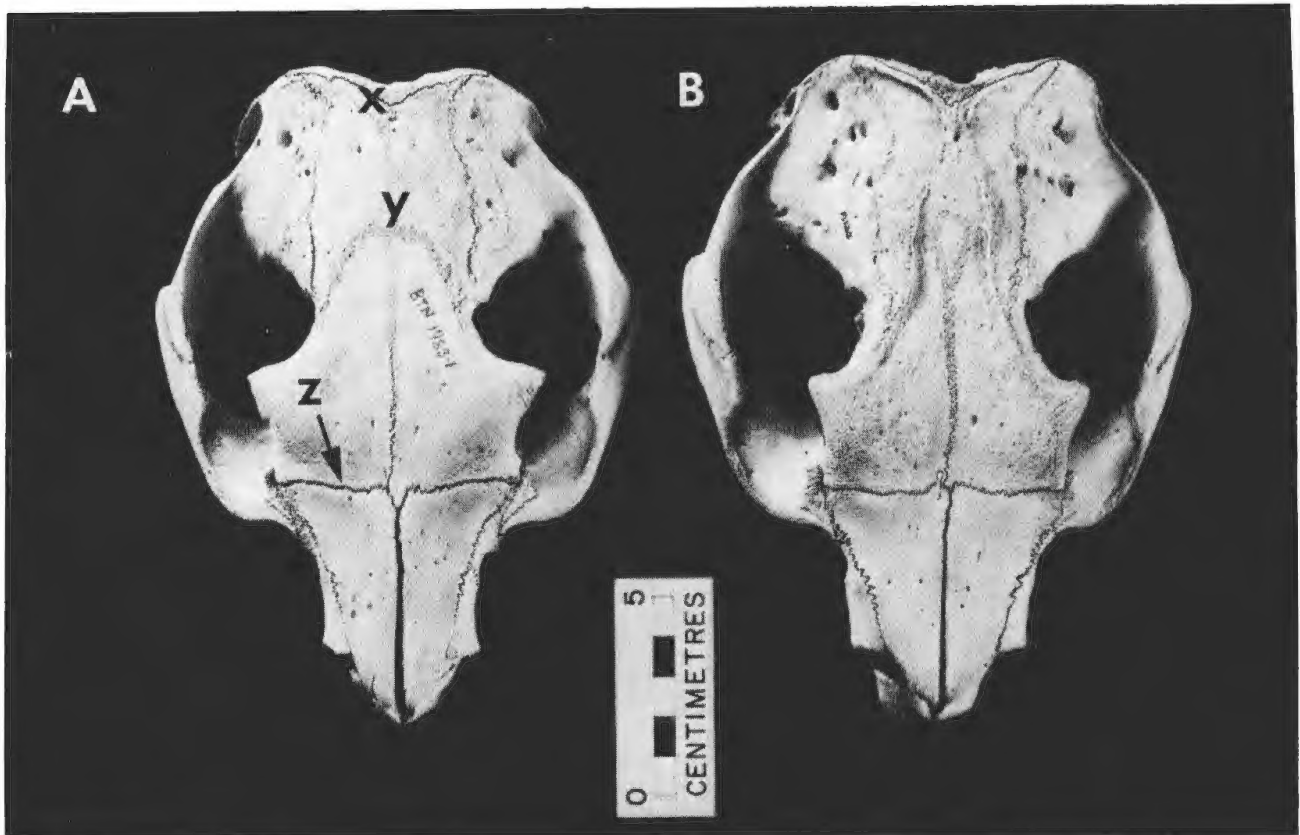


FIGURE 2. Dorsal view of the cranium of male *L. latifrons* from (A) Blanchetown, and (B) Nullarbor Station. x, nuchal crest; y, cranial vault; z, arrowed, frontonasal suture.

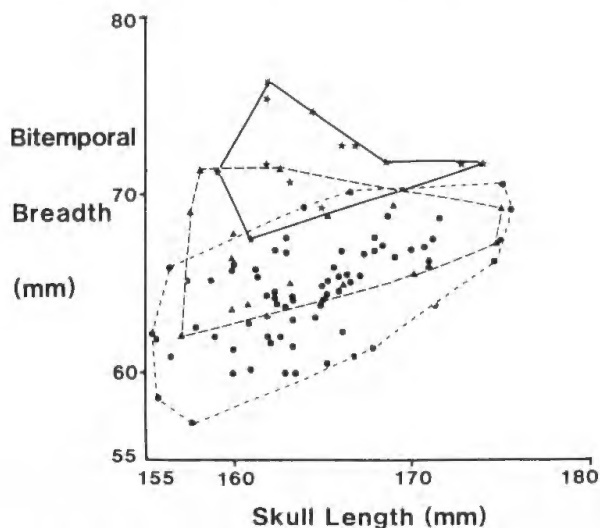


FIGURE 3. Bitemporal breadth relative to skull length of adult specimens of *L. latifrons*. (---●---), *L. latifrons* from locations at the eastern end of their range; (---▲---) from Yardea; (---★---) from the western end of their range.

Morphological differences

Frontonasal sutures are directed rostrally into the nasals in wombats from their eastern distribution, but are directed caudally into the frontals in wombats from their western distribution. Additionally in the eastern wombats the nuchal crest at its midsagittal region is slightly concave cf.

deeply concave. Also the nuchal crest is level with parietals cf. raised above parietals.

DISCUSSION

Although Crowcroft (1967) was able to distinguish Portee wombat crania from those from Nullarbor Station, and the present authors could in many instances separate the two populations by the shape of the cranial vault, these features were found to be unreliable as diagnostic characters. Indeed, this study found that approximately 23% of crania examined from their eastern distribution could be confused with those from their western distribution when using the frontonasal suture direction characteristic. There was also a 30% error when cranial vault shape was used.

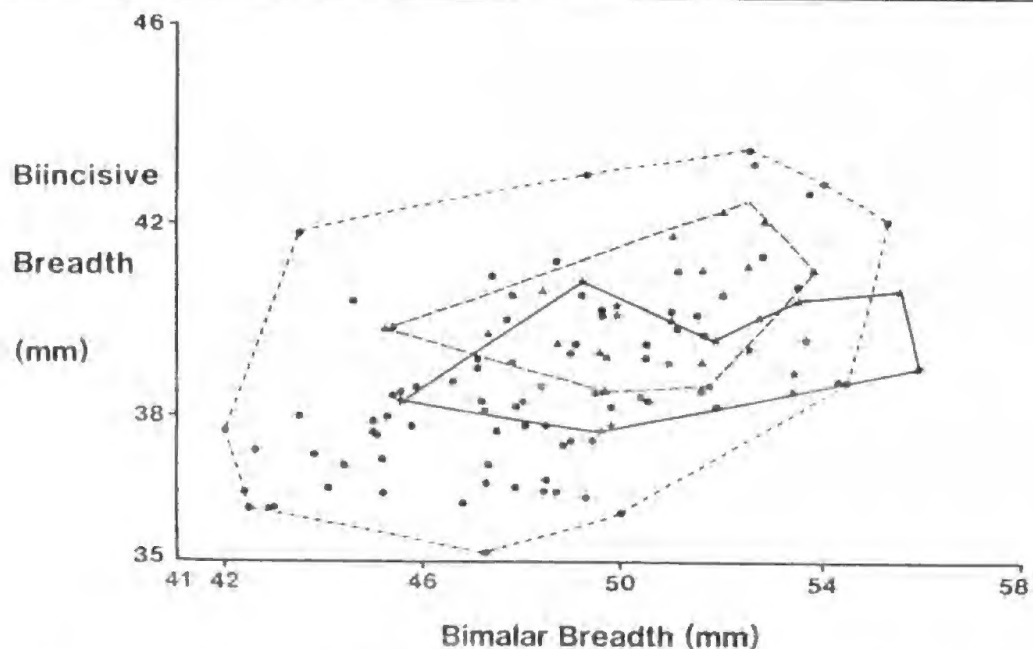
Although the morphological differences are sufficiently great to invoke Mayr's (1969) 75% Rule, under which a population is deemed to be a subspecies when 75% of its members are distinguishable from all members of a previously recognised population, data from the few available wombat crania collected from their central distribution show intermediate features suggesting that the splitting of *L. latifrons* into two subspecies is premature.

Clinal variation is suggested by the gradual

TABLE 1. Skull measurements of adult *Lasiorhinus latifrons*. Values are in millimetres.

a, Mt Gambier; b, Portee, Blanchetown, Roonka and Swan Reach; c, Yorke Peninsula; d, Eyre Peninsula; e, Yardea; f, Fowler's Bay; g, Great Australian Bight; h, Nullarbor Station.

Geographic location		a	b	c	d	e	f	g	h
Skull length	n	1	80	4	2	20	—	1	53
	$\bar{x}$	163.4	163.3	162.0	174.9	161.3	—	163.1	162.4
	sd	0.00	5.87	2.50	0.00	6.35	—	0.00	5.78
Bimalar breadth	n	1	77	3	2	16	1	1	14
	$\bar{x}$	54.3	47.9	46.5	47	50.9	51.8	52.7	51.2
	sd	0.00	3.11	1.32	0.00	2.81	0.00	0.00	2.91
Bizygomatic breadth	n	1	76	3	1	20	1	1	52
	$\bar{x}$	116.8	120.2	114.9	130.7	120.4	128.3	126.0	120.4
	sd	0.00	4.34	4.95	0.00	6.11	0.00	0.00	4.64
Bitemporal breadth	n	1	77	4	2	16	—	1	13
	$\bar{x}$	64.1	64.2	62.8	68.4	66.2	—	70.7	72.7
	sd	0.00	2.86	1.51	0.00	3.57	—	0.00	2.88
Bi-incisive breadth	n	1	78	4	2	16	1	1	14
	$\bar{x}$	38.8	38.3	37.6	39.7	40.4	39.8	40.1	39.2
	sd	0.00	1.85	1.87	0.00	1.42	0.00	0.00	1.13
Nasal length	n	—	5	—	—	—	—	—	—
	$\bar{x}$	—	56.4	—	—	—	—	—	—
	sd	—	3.91	—	—	—	—	—	—
Frontal length	n	1	26	2	—	—	—	1	3
	$\bar{x}$	67.4	63.0	59.0	—	—	—	58.4	59.9
	sd	0.00	2.77	0.00	—	—	—	0.00	1.55
Combined upper incisor breadth	n	—	15	—	—	—	—	1	1
	$\bar{x}$	—	23.9	—	—	—	—	24.6	25.1
	sd	—	1.01	—	—	—	—	0.00	0.00
Upper diastema length	n	1	71	4	2	16	1	1	14
	$\bar{x}$	40.1	38.3	38.8	43.1	38.2	42.4	40.0	39.7
	sd	0.00	2.03	0.76	0.00	1.39	0.00	0.00	2.3
Mandible length	n	1	67	3	2	16	1	—	14
	$\bar{x}$	121.00	120.4	119.4	131.8	120.5	122.8	—	122.1
	sd	0.00	3.96	1.28	0.00	4.07	0.00	—	4.63

FIGURE 4. Bi-incisive breadth relative to bimalar breadth of adult specimens of *L. latifrons*. (—●—), *L. latifrons* from locations at the eastern end of their range; (—▲—) from Yardea; (—★—) from the western end of their range.

change in frontonasal suture shape and orientation. It is generally directed rostrally into the nasals in wombats from the eastern regions of their range; straight across the nasals in those from their central distribution; and directed caudally into the frontals in animals from the western reaches of their range (Crowcroft 1967). However, there is much variability evident within the entire wombat distribution.

Analysis of the available data for *L. latifrons* show the species to be morphologically homogeneous over the extent of its geographic range. This conclusion, however, does not exclude the possibility of genetic drift, hence morphological divergence occurring within, and between, the various disjunct populations.

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CHECKLIST OF FREE-LIVING MARINE NEMATODES FROM AUSTRALIA, MACQUARIE ISLAND AND HEARD ISLAND

BY PENELOPE GREENSLADE

Summary

A checklist is provided of all records of free-living marine nematodes from Australia together with the locality from which each was recorded and the relevant references. Species are listed using the current available name and 263 species are recorded here in 119 genera belonging to 38 families.

CHECKLIST OF FREE-LIVING MARINE NEMATODES FROM AUSTRALIA, MACQUARIE ISLAND AND HEARD ISLAND

PENELOPE GREENSLADE

GREENSLADE, PENELOPE 1989. Checklist of free-living marine nematodes from Australia, Macquarie Island and Heard Island. *Rec. S. Aust. Mus.* 23(1): 7-19.

A checklist is provided of all records of free-living marine nematodes from Australia together with the locality from which each was recorded and the relevant references. Species are listed using the current available name and 263 species are recorded here in 119 genera belonging to 38 families.

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The free-living marine nematode fauna of Australia has been little studied but recent collections have shown that it is extremely rich in species (H. Platt pers. comm., W. Nicholas unpubl. results). It is clear that there is a need for considerable work on the taxonomy of the group based on surveys of the fauna of different regions and habitats in Australia. Since most genera of marine free-living nematodes appear to be cosmopolitan in distribution, keys to genera produced overseas are useful and relevant to the Australian fauna. For instance pictorial keys published overseas by Tarjan (1980) and Platt & Warwick (1983) and a recently developed computer key devised by Tarjan are relevant. However these keys need to be given an Australian emphasis by the publication of records of genera from Australia and of lists of the genera likely to be found in different habitats. Consequently it was decided to collect all previously published records so that information on the taxa already known was easily accessible. Only those species collected in or near Australian coasts have been included and no attempt has been made to list species from other Antarctic, Subantarctic or Pacific sublittoral localities.

The earliest collections were described by Cobb (1883, 1894, 1898, 1920), Irwin-Smith (1917) and Allgen (1927, 1929, 1930, 1951a, b). More recently Mawson (1953, 1957, 1958), and Inglis (1967, 1969, 1970, 1971) have worked in Australia on the fauna. Further species have been described by Decraemer (1974; 1975a, b, c, d, e; 1976; 1977 a, b; 1978 a, b, c; 1979), Decraemer & Coomans (1978 a, b), Nicholas & Stewart (1984), Stewart & Nicholas (1986) and Riemann (1986), while Hodda & Nicholas (1985, 1986a, b) have published new records of genera in most cases without identifying to species. A list of the type species in the South Australian Museum has been published by Smales (1983) although this list is not comprehensive.

The first checklist of marine free-living nematodes for Australia was produced by Johnston (1938) who listed 49 species in 33 genera and 20 families. He recorded some genera and families without described species from Australia. In the present list 263 species are recorded belonging to 119 genera in 38 families. This is only a slightly more than the number of species and genera collected from a single locality off the Tasmanian coast which contained many undescribed species and some new genera (H. Platt & K. Martin pers. comm.) so that it is certain that this list represents only a small part of the whole Australian fauna.

The recent revision of the higher classification of Lorenzen (1981) has been followed and the families are listed in the order in which he places them. For the Monhysteridae, the combinations of Jacobs (1987) have been followed. Species are listed in alphabetical order within genus, and genera are placed in alphabetical order within each family. A species is listed under the most acceptable recent name and a synonymy and list of names in earlier usage is provided if this relates to publications on Australian faunas. It was not considered necessary to give a complete world synonymy as this can be found in Gerlach & Riemann's (1973) exhaustive treatment of the group. Australian distribution records are given in full where known, together with a reference to the relevant publication. The record of Hyman I. quoted by Decraemer is believed to be Hayman Island and has been changed to the correct spelling throughout. Also there are inconsistencies in the spelling of Nympha or Nymph I.; the former spelling is used here. Records of species in Australia published here for the first time are marked with an asterisk. It must be noted also that Allgen's records should be treated with caution because his descriptions and identifications are in some instances unreliable and little material was retained. Non-Australian records have not been

included since they are available for records up to 1973 in Gerlach & Riemann (1984) and species described since that date are, probably without exception, only known from Australia.

All species included in the list are free-living and either from marine or brackish habitats. Records of genera without described species in Australia are given at the end of the species list.

CHECKLIST

Adenophorea

Chromadoridae

Actinonema longicaudatum (Steiner 1918)

Lizard I. Q., Decraemer & Coomans 1978a, b.

Atrochromadora denticulata Wieser & Hopper 1967

Lizard I. Q., Decraemer & Coomans 1978a;
Davies Reef Q., Alongi 1986.

Atrochromadora microlaima (de Man 1889)

= *Chromadora microlaima* de Man 1889

= *Chromadorina microlaima* (de Man 1889).
Tas., Allgen 1927; Port Jackson N.S.W., Allgen 1951a.

Atrochromadora parva (de Man 1893)

= *Spiliphora parva* de Man 1893.

Tas., Allgen 1927. (Tasmanian record not in Gerlach & Riemann 1973.)

Austranema alii (Murphy 1965)

Shark Bay W.A., Inglis 1969.

Austranema pectinatum (Wieser & Hopper 1967)

Lizard I. Q., Decraemer & Coomans 1978a.

Chromadora macrolaima de Man 1889

= *Chromadorina macrolaima* (de Man 1889).
Tas., Allgen 1927.

Chromadora macrolaimoides Steiner 1915

Tas., Allgen 1927. Lizard I. Q., Decraemer & Coomans 1978a.

Chromadora nudicapitata Bastian 1865

= *Chromadora siciliana* Wieser 1954.

Lizard I. Q., Decraemer & Coomans 1978a.

Chromadorella filiformis (Bastian 1865)

Port Jackson N.S.W., Allgen 1951a.; Davies Reef Q., Alongi 1986.

Chromadorina germanica (Butschli 1874)

= *Chromadora minor* Cobb 1894.

Port Jackson N.S.W., Cobb 1894.

Chromadorina pacifica (Allgen 1947)

= *Chromadora pacifica* Allgen 1947,
Port Jackson N.S.W., Allgen 1951a.

Chromodorita minor (Allgen 1927)

= *Hypodontolaimus minor* Allgen 1927
Tas., Allgen 1927.

Dichromadora apapillata Timm 1961

Lizard I. Q., Decraemer & Coomans 1978a.

Dichromadora geophila (de Man 1876)

Lizard I. Q., Decraemer & Coomans 1978a.

Euchromadora eileenae Inglis 1969

Radar Reef, Strickland Bay, Rottneest I., Shark Bay, Cheyne Beach, nr Albany W.A., Inglis 1969.

Euchromadora striata (Eberth 1963)

Rottneest I., nr Albany, Cape Leeuwin W.A., Inglis 1969.

Graphonema georgel Inglis 1969

Albany W.A., Inglis 1969.

Graphonema vulgare (*vulguris* ?) Cobb 1898

Australian coasts N.S.W., Vic., Cobb 1898.

Graphonema amokurae (Ditlevsen 1921)

= *Euchromadora amokurae* (Ditlevsen 1921).

Port Jackson N.S.W., Allgen 1951a.

Neochromadora apud tecta Gerlach 1951

Lizard I. Q., Decraemer & Coomans 1978a;
Davies Reef Q., Alongi 1986.

Neochromadora wallini (Allgen 1927)

= *Chromadora wallini* Allgen 1927.

Tas., Allgen 1927.

Parapinnanema wilsoni Inglis 1969

Cape Leeuwin, Geographe Bay W.A., Inglis 1969.

Prochromadorella conicaudata (Allgen 1927)

= *Chromadora conicaudata* Allgen 1927.

Tas., Allgen 1927.

Prochromadorella ditlevseni (de Man 1922)

Lizard I. Q., Decraemer & Coomans 1978a.

Prochromadorella paramucrodonta (Allgen 1929)

= *Chromadora paramucrodonta* Allgen 1929.

Macquarie I., Allgen 1929; Port Jackson N.S.W., Allgen 1951a.

Lizard I. Q., Decraemer & Coomans 1978a;
Davies Reef Q., Alongi 1986.

Ptycholaimellus lizardiensis Decraemer & Coomans 1978

Lizard I. Q., Decraemer & Coomans 1978a, b.

Ptycholaimellus slacksmithi (Inglis 1969)

= *Hypodontolaimus slacksmithi* Inglis 1969.

Shark Bay, Cowaramup Bay W.A., Inglis 1969.

Spiliphora dolichura de Man 1893

Port Willunga, Brighton S.A., Mawson 1957.

Spilophorella campbelli Allgen 1928.

Port Jackson N.S.W., Allgen 1951a.

Spilophorella paradoxa (de Man 1888)

Lizard I. Q., Decraemer & Coomans 1978a;
Davies Reef Q., Alongi 1986.

Spilophorella tasmaniensis Allgen 1927

Tas., Allgen 1927.

Steineridora loricata (Steiner 1916)

= *Spiliphora loricata* Steiner 1916 (or *Spilophara* Johnston 1938)

= *Euchromadora loricata* (Steiner 1916).

Tas., Allgen 1927; Port Jackson N.S.W., Allgen 1951a.

Ethmolaimidae

Ethmolaimus multipapillatus Paramonov 1926

Lizard I. Q., Decraemer & Coomans 1978a.

Neotonchidae

Neotonchus apud melotridus Wieser & Hopper 1966

Lizard I. Q., Decraemer & Coomans 1978a.

Cyatholaimidae

Acanthonchus viviparus Cobb 1920

= *Seuratiella pedroensis* Allgen 1947.
Port Jackson N.S.W., Allgen 1951a.

Longicyatholaimus heterurus (Cobb 1898)

= *Cyatholaimus heterurus* Cobb 1898.
Port Jackson N.S.W., Cobb 1898.

Longicyatholaimus minor (Cobb 1898)

= *Cyatholaimus minor* Cobb 1898.
Port Jackson N.S.W. Cobb 1898.

Longicyatholaimus trichurus (Cobb 1898)

= *Cyatholaimus trichurus* Cobb 1898.
Port Jackson N.S.W., Cobb 1898.

Metacyatholaimus brevicollis (Cobb 1898)

= *Cyatholaimus brevicollis* Cobb 1898.
Port Jackson N.S.W., Cobb 1898.

Paracanthonchus caecus (Bastian 1865) (as *coecus* in Allgen 1951a)

Port Jackson N.S.W., Allgen 1951a.

Paracanthonchus cheynei Inglis 1970

Cheyne Beach, Radar Reef, Rottneest I, W.A.,
Inglis 1970.

Paracanthonchus hartogi Inglis 1970

Shark Bay W.A., Inglis 1970.

Paracanthonchus kartanum (Mawson 1953)

= *Harveyjohnstonia kartanum* Mawson 1953.
Pennington Bay, Kangaroo I. S.A., Mawson
1953; Cheyne Beach, Goode Beach, Hall's
Head, Bunker Bay W.A., Inglis 1970.

Paracanthonchus margaretae Inglis 1970

Cheyne Beach, Windy Harbour, Bunker Bay,
Cape Naturalist W.A., Inglis 1970.

Paracanthonchus parahurtogi Decraemer &
Coomans 1978

Lizard I. Q., Decraemer & Coomans 1978a, b.

Paracanthonchus paramacrodon Allgen 1947

Port Jackson N.S.W., Allgen 1951a

Paracyatholaimus exilis (Cobb 1898)

= *Cyatholaimus exilis* Cobb 1898.
Port Jackson N.S.W., Cobb 1898.

Paracyatholaimus proximus (Bütschli 1874)

= *Cyatholaimus proximus* Bütschli 1874.
Tas., Allgen 1927.

Præacanthonchus cygnis Inglis 1970

Woodman's Point, Freemantle W.A., Inglis
1970.

Xyzzors inglisi Wieser & Hopper 1967

Lizard I. Q., Decraemer & Coomans 1978a.

Selachinematidae = Choniolaimidae

Halichoanolaimus australis Cobb 1898

Port Jackson N.S.W., Cobb 1898.

Halichoanolaimus ovalis Ditlevsen 1921

Edithburg S.A., Mawson 1957.

Halichoanolaimus quattuordecimpapillatus
Chitwood 1951

Lizard I. Q., Decraemer & Coomans 1978a, b.

Halichoanolaimus robustus (Bastian 1865)

Outer Harbour, Port Adelaide S.A., Mawson
1957.

Desmodoridae

Acanthopharynx distechei Decraemer & Coomans
1978

Lizard I. Q., Decraemer & Coomans 1978a, b.

Desmodora (Pseudochromadora) caeca Gerlach
1956

Hunter R., Fullerton Cove N.S.W., Hodda &
Nicholas 1985, 1986a, b.

Desmodora (Croconema) cincla (Cobb 1920)

Lizard I. Q., Decraemer & Coomans 1978a.

Desmodora (Zalonema) megalosoma Steiner 1918

Lizard I. Q., Decraemer & Coomans 1978a.

Laxus longus Cobb 1894

Port Jackson N.S.W., Cobb 1894.

Metachromadora (M.) clavata Gerlach 1957

Lizard I. Q., Decraemer & Coomans 1978a.

Onyx apud perfectus Cobb 1891

Lizard I. Q., Decraemer & Coomans 1978a.

Paradesmodora campbelli (Allgen 1932)

Lizard I. Q., Decraemer & Coomans 1978a;
Davies Reef Q., Alongi 1986.

Pseudonchus jenseni Murphy 1964

Bobbin Head N.S.W., Murphy 1964.

Spirinia (S.) laevioides Gerlach 1963

Lizard I. Q., Decraemer & Coomans 1978a.

Spirinia similis (Cobb 1898)

= *Spira similis* Cobb 1898.

Port Jackson N.S.W., Cobb 1898.

Draconematidae

Draconema falcatum (Irwin-Smith 1918)

= *Chaetosoma falcata* Irwin-Smith 1918.

Sydney and environs N.S.W., Irwin-Smith 1918.

Draconema haswelli (Irwin-Smith 1918)

= *Chaetosoma haswelli* Irwin-Smith 1918.

Sydney and environs N.S.W., Irwin-Smith,
1918.

Notochaetosoma cryptocephalum Irwin-Smith 1918

Sydney and environs N.S.W., Irwin-Smith 1918.

Notochaetosoma tenax Irwin-Smith 1918

Sydney and environs N.S.W., Irwin-Smith 1918.

Microlaimidae

Acanthomicrolaimus jenseni Stewart & Nicholas
1987

Broulee beach N.S.W. Stewart & Nicholas 1987.

Microlaimus problematicus Allgen 1932

Lizard I. Q., Decraemer & Coomans 1978a.

Microlaimus capillaris Gerlach 1957

Clyde River N.S.W. Jensen (in press).

Leptolaimidae

Camacolaimus exilis (Cobb 1920)

Lizard I. Q., Decraemer & Coomans 1978a.

Paraphanolaimus anisitsi (Daday 1905)

Lizard I. Q., Decraemer & Coomans 1978a

Plectidae

Plectus longicaudatus Butschli 1873

Lizard I. Q., Decraemer & Coomans 1978a.

Teratocephalidae

Euteratocephalus palustris (De Man 1880)

Lizard I. Q., Decraemer & Coomans 1978a.

Monhysteridae

Geomonhystera australis (Cobb 1893)

= *Monhystera australis* Cobb 1893.

Port Jackson N.S.W., Cobb 1893.

Monhystrella gracilis Khera 1966

= *Monhystrella apud gracilis* Khera 1966.

Lizard I. Q., Decraemer & Coomans 1978a.

Monhystrella marina Timm 1964

Lizard I. Q., Decraemer & Coomans 1978a.

Thalassomonhystera diplops (Cobb 1894)

= *Monhystera diplops* Cobb 1894.

Port Jackson N.S.W., Cobb 1894.

Thalassomonhystera tasmaniensis (Allgen 1927)

= *Monhystera tasmaniensis* Allgen 1927.

Tas., Allen 1927.

Xyalidae

Daptonema australis (Allgen 1951)

= *Theristus australis* Allgen 1951, *sp. inq.* Lorenzen 1977.

Port Jackson N.S.W., Allgen 1951a.

Daptonema lata (Cobb 1894)

= *Cylindrotheristus latus* (Cobb 1894)

= *Monhystera lata* Cobb 1894, *sp. inq.* Lorenzen 1977.

Port Jackson N.S.W., Cobb 1894.

Daptonema setosa (Butschli 1874)

= *Mesotheristus setosus* Butschli 1874, *syn.* Lorenzen 1977

= *Monhystera gracillima* Cobb 1894.

Neutral Bay, Port Jackson N.S.W., Cobb 1894.

Rhynchonema cinctum Cobb 1920

Davies Reef Q., Alongi 1986.

Steineria apud ampullacea Wieser & Hopper 1967

Lizard I. Q., Decraemer & Coomans 1978a.

Steineria pulchra Mawson 1957

Outer Harbour, Encounter Bay S.A., Mawson 1957.

Steineria setosissima (Cobb 1894)

= *Monhystera setosissima* Cobb 1894.

Port Jackson N.S.W., Cobb 1894.

Theristus brevicollis (Cobb 1894)

= *Monhystera brevicollis* Cobb 1894.

Port Jackson N.S.W., Cobb 1894.

Theristus (Penzancia) flevensis Stekhoven 1935

Lizard I. Q., Decraemer & Coomans 1978a;

Davies Reef Q., Alongi 1986 *lapsus flavis*.

Theristus interstitialis Warwick 1970

Fullerton Cove, Hunter River N.S.W., Hodda & Nicholas 1985, 1986a, b.

Theristus macquariensis (Allgen 1929)

= *Monhystera macquariensis* Allgen 1929, *sp. incertae sedis* Jacobs 1987.

Macquarie I., Allgen 1929.

Theristus (Penzancia) metaflavensis Gerlach 1955

Lizard I. Q., Decraemer & Coomans 1978a.

Theristus pacificus (Johnston 1938)

= *Monhystera pacifica* Johnston 1938

= *Monhystera australis* Cobb 1984.

Port Jackson, N.S.W., Cobb 1893.

Theristus quadripapillatus Decraemer & Coomans 1978

Lizard I. Q., Decraemer & Coomans 1978a, b; Davies Reef Q., Alongi 1986.

Sphaerolaimidae

Sphaerolaimus hirticollis Cobb 1898

Port Jackson N.S.W., Cobb 1898.

Sphaerolaimus papillatus Kreis 1929

Clyde R. Estuary N.S.W., Nicholas, Goodchild & Stewart 1987.

Desmoscolecidae

Desmolorenzenia cooleni Decraemer 1978

Low I, Great Barrier Reef Q., Decraemer 1978b.

Desmolorenzenia crassicauda (Timm 1970)

Lizard I. Q., Decraemer 1977a.

Desmoscolex asetosus Decraemer 1975

800 m W of Lizard I., Nymphe I. Q., Decraemer 1975b.

Desmoscolex australicus Decraemer 1975

Yonge Reef Q., Decraemer 1975e.

Desmoscolex brevisetosus Decraemer 1974

Nymphe I., Lizard I. Q., Decraemer 1974.

Desmoscolex deconincki Decraemer 1975

Nymphe I, Yonge Reef Q., Port Jackson N.S.W., Decraemer 1975c.

Desmoscolex dimorphus Decraemer 1974

800 m W of Lizard I., Yonge Reef, Nymphe I. Q., Decraemer 1974a.

Desmoscolex falcatus Lorenzen 1972

Lizard I., Yonge Reef Q., Decraemer 1975e.

Desmoscolex geraerti Decraemer 1974

Yonge Reef Q., Decraemer 1974a.

Desmoscolex gerlachi Timm 1970

Lizard I. Q., Decraemer 1975e.

Desmoscolex granulatus Decraemer 1975

Yonge Reef, Lizard I. Q., Decraemer 1975a.

Desmoscolex luevis Kreis 1928

Nymphe I., Yonge Reef, Lizard I. Q., Decraemer 1975a, Decraemer & Coomans 1978a.

- Desmoscolex leptus* Steiner 1916
1 km behind Yonge Reef Q., Decraemer 1975b.
- Desmoscolex longisetosus* Timm 1970
Yonge Reef Q., Decraemer 1975c.
- Desmoscolex membranatus* Decraemer 1975
800 m W of Lizard I., Nymphe I., between One Tree I. and Wistari Reef Q., Decraemer 1975e.
- Desmoscolex minutus* Claparede 1863
Nymphe I. Q., Decraemer 1975a.
- Desmoscolex nudus* Chitwood 1951
800 m W of Lizard I., Decraemer 1975b.
- Desmoscolex nymphianus* Decraemer 1974
Nymphe I. Q., Decraemer 1974a.
- Desmoscolex paraleptus* Decraemer 1975
Yonge Reef Q., Decraemer 1975b.
- Desmoscolex rudolfi* Steiner 1916
Broulee N.S.W., det. W. Decraemer, 1986.
- Desmoscolex yongei* Decraemer 1975
Yonge Reef Q., Decraemer 1975e.

Meyllidae

- Desmotimmia mirabilis* (Timm 1961)
Yonge Reef, Lizard I., Three Isles, between Cairns and Hayman I. Q., Decraemer 1975d.
- Quadricoma cobbi* (Steiner 1916)
Between Cairns and Hayman I., Lizard I. Q., Decraemer 1978a.
- Quadricoma crassicomoides* Timm 1970
Lizard I., Nymphe I. Q., Decraemer 1978a.
- Quadricoma freudenhaimer* Decraemer 1977
800 m W of Lizard I. Q., Decraemer 1977b.
- Quadricoma lizardiensis* Decraemer 1977
800 m W of Lizard I. Q., Decraemer 1977b.
- Quadricoma naffsingeriae* Decraemer 1977
Three Isles, Lizard I., between One Tree I. and Wistari Reef, between Cairns and Hayman I. Q., Decraemer 1977b.
- Quadricoma papillata* Decraemer 1977
800 m W of Lizard I., Three Isles, between Cairns and Hayman I. Q., Decraemer 1977b.
- Quadricomoides alleni* Decraemer 1976
Lizard I., Nymphe I., Three Isles, Yonge Reef Q., Decraemer 1976.
- Quadricomoides coomansi* Decraemer 1976
Between Cairns and Hayman I. Q., Decraemer 1976.
- Quadricomoides pedunculata* Decraemer 1976
Young Reef, between Cairns and Hayman I. Q., Decraemer 1976.
- Prototricoma dherdei* Decraemer 1978
Between Cairns and Hayman I. Q., Decraemer 1978b.
- Tricoma aculeata* Decraemer 1978c
Yonge Reef Q., Decraemer 1978c.
- Tricoma absidata lizardiensis* Decraemer 1979
Lizard I. Q., Decraemer 1979.
- Tricoma allgeni* Decraemer 1978
Yonge Reef Q., Decraemer 1978c.

- Tricoma brevirostris* (Southern 1914)
Yonge Reef Q., Decraemer 1978c.
- Tricoma brevispicula* Decraemer 1978
Yonge Reef Q., Decraemer 1978c.
- Tricoma dimorpha* Decraemer 1978
Yonge Reef Q., Decraemer 1978c.
- Tricoma fisheri* Timm 1970
Between One Tree I. and Wistari Reef Q., Decraemer 1978c.
- Tricoma goldeni* Decraemer 1978
Yonge Reef Q., Decraemer 1978c.
- Tricoma hoplostoma* Decraemer 1978
Yonge Reef Q., Decraemer 1978c.
- Tricoma hopperi australiensis* Decraemer 1978
Yonge Reef Q., Decraemer 1978c.
- Tricoma longispicula* Decraemer 1978
Yonge Reef Q., Decraemer 1978c.
- Tricoma pachycephala* Decraemer 1978
800 m W of Lizard I. Q., Decraemer 1978c.
- Tricoma platapophysa* Decraemer 1978
Yonge Reef Q., Decraemer 1978c;
Broulee N.S.W., det. W. Decraemer 1986.
- Tricomur riemanni* Decraemer 1978
Yonge Reef Q., Decraemer 1978c.
- Tricoma rostralis* Decraemer 1978
Lizard I., Decraemer 1978c.
- Tricoma septuaginta* Stekhoven 1942
Yonge Reef Q., Decraemer 1978c.
- Tricoma similis* Cobb 1912
Yonge Reef Q., Decraemer 1978c.
- Tricoma timmi* Decraemer 1978
800m W of Lizard I., Yonge Reef Q., Decraemer 1978c.

Siphonolaimidae

- Siphonolaimus purpureus* (Cobb 1894)
= *Chromagaster purpurea* Cobb 1894.
North Arm, Port Adelaide S.A., Cobb 1894.

Linhomoeidae

- Cryptolaimus pellucidus* Cobb 1933
North Arm, Port Adelaide S.A. Cobb 1933.
- Eleutherolaimus filicaudata* (Allgen 1929)
= *Monhystera filicaudata* Allgen 1929, sp. inq.
Jacobs 1987.
Davies Reef Q., Alongi 1986.
- Megadesmolaimus uncinatus* Gerlach 1963
Lizard I. Q., Decraemer & Coomans 1978a.
- Metalinhomoeus setosus* Chitwood 1951
Lizard I. Q., Decraemer & Coomans 1978a.
- Paralinhomoeus macquariensis* (Allgen 1929)
= *Linhomoeus macquariensis* Allgen 1929,
Macquarie I., Allgen 1929.
- Terschellingia exilis* Cobb 1898
Port Jackson N.S.W., Cobb 1898.
- Terschellingia longicaudata* de Man 1907
Hunter R., Fullerton Cove N.S.W., Hodda & Nicholas 1985, 1986a, b; Clyde R. Estuary

N.S.W., Nicholas, Goodchild & Stewart 1987;
Lizard I. Q., Decraemer & Coomans 1978a, b;
Davies Reef Q., Alongi 1986.

Axonolaimidae

Axonolaimus caudostratus Boucher 1973
Lizard I. Q., Decraemer & Coomans 1978a;
Davies Reef Q., Alongi 1986.
Nicasolaimus punctatus Riemann 1986
Kioloa Beach N.S.W., Riemann 1986.

Comesomatidae

Comesoma arenae Gerlach 1956
Bobbins Head N.S.W., Murphy 1964. (?syn.
'*Comesoma simile*' sensu Wieser 1954, Gerlach
& Riemann 1973).
Comesoma simile Cobb 1898 *lapsus similis*
Port Jackson N.S.W. Cobb 1898; Davies Reef
Q. Alongi 1986 *lapsus similis*.
Paracomesome dubium (Filipjev 1918)
Lizard I. Q., Decraemer & Coomans 1978a, b;
Davies Reef Q., Alongi 1986.
Sabatieria heterura (Cobb 1898)
= *Comesoma heterura* Cobb 1898.
Port Jackson N.S.W., Cobb 1898; Davies Reef
Q., Alongi 1986.
Sabatieria filicauda Allgen 1951
37°5' S, 150°05' E Allgen 1951a.
Sabatieria jubata (Cobb 1898)
= *Comesoma jubatum* Cobb 1898 *lapsus jubata*,
Port Jackson N.S.W., Cobb 1898.
Sabatieria wieseri Platt 1985
Clyde R. Estuary N.S.W., Nicholas, Goodchild
& Stewart 1987.

Diplopeltidae

Araeolaimus elegans de Man 1888
= *Araeolaimus spectabilis* Ditlevsen 1921.
Tas., Allgen 1927.
Araeolaimus longicauda Allgen 1929
Port Jackson N.S.W., Allgen 1951a.

Enoplida

Enoplidae

Enoplus alpha Inglis 1971
Radar Reef, Stickland Bay, Rottnest I. W.A.,
Inglis 1971.
Enoplus heardensis Mawson 1958
Heard I., Mawson 1958.
Enoplus meridionalis Steiner 1921
= *Enoplus communis meridionalis* Steiner 1921.
Radar Reef, Stickland Bay, Rottnest I. W.A.,
Inglis 1971; Port Willunga S.A., Mawson 1953.
Enoplus michaelsoni Linstow 1896
Macquarie I., Mawson 1958.

Enoplus micrognathus Allgen 1947
Port Jackson N.S.W., Allgen 1951 a.
Enoplus paraluttoralis Wieser 1953
Heard I., Macquarie I., Mawson 1958.

Thoracostomopsidae

Enoplolaimus disasteri Allgen 1951 (listed as
Enoplus by Allgen 1951a)
Disaster Bay, N.S.W., Allgen 1951a. *Incertae
sedis* (Wieser 1953).
Epacanthion brevispiculosum Mawson 1958
Macquarie I., Mawson 1958.
Epacanthion georgei Inglis 1971
Cowaramup Bay W.A., Inglis 1971.
Mesacanthion gracilisetosum (Allgen 1930)
= *Enoplolaimus gracilisetosus* Allgen 1930.
Macquarie I., Allgen 1930; Wata Muri N.S.W.,
Mawson 1953.
Mesacanthion kerguelenense Mawson 1958
Heard I., Macquarie I., Mawson 1958.
Oxyonchus subantarcticus Mawson 1958
Macquarie I., Mawson 1958.

Anoplostomatidae

Anoplostoma campbelli Allgen 1932
Macquarie I., Mawson 1958.

Phanodermatidae

Paraphanoderma robynnae Inglis 1971
Bunker Bay, Geographe Bay W.A., Inglis 1971.
Phanoderma campbelli Allgen 1928
Port Jackson N.S.W., Allgen 1951a; Macquarie
I., Mawson 1958.
Phanoderma cocksi Bastian 1865
= *Phanoderma filipjevi* Micoletzky 1924,
Macquarie I., Mawson 1958.
Phanoderma ocellatum (Cobb 1920)
= '*Phanoderma mediterraneum*' nec Micoletzky
1923 sensu Allgen 1947.
Lizard I. Q., Decraemer & Coomans 1978a;
Port Jackson N.S.W., Allgen 1951a.
Phanoderma serratum Ditlevsen 1930
Goode Beach, Sarge Bay, Bunker Bay,
Geographe Bay W.A., Inglis 1971.
Phanoderma wieseri Mawson 1956
Macquarie I., Mawson 1958.

Anticomatidae

Anticoma acuminata Eberth 1863
= *Anticoma similis* Cobb 1898.
Port Jackson N.S.W., Cobb 1898; Allgen 1951a.
Outer Harbour, Brighton Beach S.A., Mawson
1957.
Anticoma campbelli Allgen 1932
Macquarie I., Mawson 1958.
Anticoma cobbi Inglis 1971
Hall's Head, Mandurah W.A., Inglis 1971.
Anticoma columba Wieser 1953

- =*Anticoma australis* Mawson 1956.
 Heard I., Macquarie I., Mawson 1958.
Anticoma lata Cobb 1898
 Port Jackson N.S.W., Cobb 1898.
Anticoma submillis Cobb 1914
 Heard I., Macquarie I., Mawson 1958.
Anticoma trichura Cobb 1898
 Port Jackson N.S.W., Cobb 1898.
Platycomopsis gibbonensis (Mawson 1953)
 =*Anticomopsis gibbonensis* Mawson 1953.
 Port Gibbon N.S.W., Mawson 1953.
- Ironidae**
Thalassironus britannicus de Man 1889
 Lizard I., Q., Decraemer & Coomans 1978a.
Thalassironus jungi Inglis 1964
 Lizard I. Q., Decraemer & Coomans 1978a.
Trissonchulus oceanus Cobb 1920
 Lizard I. Q., Decraemer & Coomans 1978a.
- Leptosomatidae**
Deontostoma antarcticum (Linstow 1892)
 =*Thoracostoma antarcticum* (Linstow 1892),
 Heard I., Macquarie I., Mawson 1958.
Deontostoma aucklandiae (Ditlevsen 1921)
 =*Thoracostoma aucklandiae* Ditlevsen 1921.
 Port Jackson N.S.W., Allgen 1951a.
Leptosomatides conisetosus Stekhoven & Mawson 1955
 Macquarie I., Mawson 1958
Leptosomatium arcticum Filipjev 1916
 Heard I., Macquarie I., Mawson 1958.
Leptosomatium bacillatum (Eberth 1863)
 Port Jackson N.S.W., Allgen 1951a.
Leptosomatium elongatum Bastian 1865
 Port Jackson N.S.W., Allgen 1951a.
Leptosomatium micoletzkyi Inglis 1971
 Cowaramup Bay W.A., Inglis 1971.
Leptosomatium sabangense Steiner 1915
 =*Leptosomatium elongatum sabangense* Steiner 1915 (*lapsus sabangensis*).
 Port Jackson N.S.W., Allgen 1951a.
Leptosomella phaustra Inglis 1971
 Sarge Bay, Cape Leuwin W.A., Inglis 1971.
Thoracostoma angustifissulatum Mawson 1956.
 Heard I., Macquarie I., Mawson 1958.
Thoracostoma anocellatum Stekhoven & Mawson 1955
 Heard I., Macquarie I., Mawson 1958.
Thoracostoma arcticum Ssaveljev 1912
 Macquarie I., Mawson 1958.
Thoracostoma australe Mawson 1953
 Port Gibbon, Port Hacking, Wata Muri N.S.W.,
 Mawson 1953.
Thoracostoma campbelli Ditlevsen 1921
 Macquarie I., Heard I., Mawson 1958.
Thoracostoma coronatum (Eberth 1863)
 37°5'S, 150°05"E.

- Pseudocella panamaense* (Allgen 1947)
 =*Thoracostoma panamaense* Allgen 1947.
 Macquarie I., S.A., Mawson 1958.
Pseudocella trichodes (Leuckart 1849)
 =*Thoracostoma trichodes* (Leuckart 1849).
 Port Jackson N.S.W., Allgen 1951a.

Oxystominidae

- Halalaimus comatus* Wieser 1953
 Heard I., Macquarie I., Mawson 1958.
Halalaimus fletcheri Mawson 1958
 Macquarie I., Mawson 1958.
Halalaimus macquariensis Mawson 1958
 Macquarie I., Mawson 1958.
Nemanema campbelli (Allgen 1932)
 =*Oxystomatina campbelli* Allgen 1932.
 Macquarie I., Mawson 1958.
Oxystomina pellucida (Cobb 1898)
 =*Oxystoma pellucidum* Cobb 1898 (*lapsus pellucida*).
 Port Jackson N.S.W., Cobb 1898.

Oncholaimidae

- Adoncholaimus crassicaudus* Wieser 1953
 Macquarie I., Mawson 1958.
Metoncholaimoides squalus Wieser, 1953.
 Macquarie I., Mawson 1958.
Metoncholaimus brevispiculum Mawson 1957
 Brighton S.A., Mawson 1957.
Metoncholaimus pristiurus (Z. Strassen 1894)
 Port River, S.A., Mawson 1953.
Mononcholaimus tasmaniensis Allgen 1927
 =*Mononcholaimus elegans tasmaniensis* Allgen 1927 (the nominate species is recorded in *Viscosia* by Platt & Warwick 1983.)
 Tas., Allgen 1927.
Oncholaimus brachycercus de Man 1889
 Lizard I. Q., Decraemer & Coomans 1978a.
Oncholaimus dujardinii de Man 1876 (given as *dujardini* by Allgen 1951a)
 Macquarie I., Mawson 1958; Port Jackson N.S.W., Allgen 1951a.
Oncholaimus leptos Mawson 1958
 Heard I., Macquarie I., Mawson 1958.
Oncholaimus apud opisthonchus Filipjev 1927
 Lizard I. Q., Decraemer & Coomans 1978a.
Oncholaimus paredron (Mawson 1958)
 =*Oncholaimium paredron* Mawson 1958.
 Macquarie I., Mawson 1958.
Oncholaimus paralangrunensis (Allgen 1947)
 =*Viscosia paralangrunensis* Allgen 1947.
 Port Jackson N.S.W., Allgen 1951a.
Oncholaimus viridis Bastian 1865
 Tas., Allgen 1927; Port Jackson N.S.W., Allgen 1951a.
Pelagonema obtusicaudum Filipjev 1918 (given as *obtusicauda* by Allgen 1951a).
 Port Jackson, Disaster Bay N.S.W., Allgen 1951a, b.

- Pelugonema tenue* Kreis 1928
Port Jackson N.S.W., Allgen 1951a.
- Pontonema cobbi* Mawson 1956
Macquarie I., Mawson 1958.
- Pantonema donsi* (Allgen 1932)
Lizard I. Q., Decraemer & Coomans 1978a.
- Pontonema hackingi* Mawson 1953
Port Hacking N.S.W., Mawson 1953.
- Pantonema leidyi* Mawson 1956
Macquarie I., Mawson 1958.
- Pontonema serratodentatum* Mawson 1956
Heard I., Macquarie I., Mawson 1958.
- Prioncholaimus mawsonae* Inglis 1971
Aquarium, Perth W.A., Inglis 1971.
- Prioncholaimus megastoma* (Eberth 1863)
Outer Harbour S.A., Mawson 1957.
- Viscosia glabra* (Bastian 1865)
Port Jackson, Disaster Bay N.S.W., Allgen 1951a.
- Viscosia apud macramphida* Chitwood 1951
Lizard I. Q., Decraemer & Coomans 1978a;
Davies Reef Q., Alongi 1986.
- Viscosia pellucida* (Cobb 1898)
= *Oncholaimus pellucidus* Cobb 1898.
Port Jackson N.S.W., Cobb 1898.
- Viscosia wieseri* Mawson 1958
Macquarie I., Mawson 1958.
- Echelidiidae**
- Calyptronema mawsoni* Mawson 1958
Heard I., Macquarie I., Mawson 1958.
- Enchelidium brevicaudatum* Allgen 1947
Port Jackson N.S.W., Allgen 1951a.
- Eurystomina californica* (Allgen 1947)
= *Eurystomatina californicum* Allgen 1947
Port Jackson N.S.W., Allgen 1951a.
- Eurystomina eurylaima* (Ditlevsen, 1930)
= *Marionella eurylaima* Ditlevsen 1930.
Radar Reef, Strickland Bay, Rottneest I.,
Woodmans Point, Cockburn Sound W.A.,
Inglis 1971.
- Eurystomina fenestella* Weiser 1953
Heard I., Macquarie I., Mawson 1958.
- Eurystomina minutisculae* Chitwood 1951
Lizard I. Q., Decraemer & Coomans 1978a.
- Eurystomina ornata* (Eberth 1863)
= *Eurystomatina ornata* (Eberth 1863) (given as
ornatum by Allgen 1951a).
Port Jackson N.S.W., Allgen 1951a.
- Ledovitia fallae* Mawson 1958
Macquarie I., Mawson 1958.
- Polygastrophoru hexabulba* (Filipjev 1918)
= *Bolbella pacifica* Ditlevsen 1930.
Port Jackson N.S.W., Allgen 1951a; Outer
Harbour, Brighton, Port Willunga, Port
Noarlunga S.A., Mawson 1957; Lizard I. Q.,
Decraemer & Coomans 1978a; Davies Reef Q.,
Alongi 1986.

- Symplocostoma tenuicolle* (Eberth 1863)
= *Enchelidium tenuicolle* Eberth 1863
= *Symplocostoma longicollis* Bastian 1865.
Tas., Allgen 1927; Port Jackson N.S.W., Allgen
1951a; Pennington Bay, Kangaroo I. S.A.,
Mawson 1953.
- Symplocostomella johnstoni* Mawson 1953
Point Gibbon N.S.W., Mawson 1953.
- Tripyloididae**
- Bathylaimus australis* Cobb 1894
Port Jackson N.S.W., Cobb 1894; Lizard I. Q.,
Decraemer & Coomans 1978a, b.
- Tripyla tenuicauda* Cobb 1893
Sydney N.S.W., Cobb 1893.

Tylenchida

Criconematidae

- Criconemella avicenniae* Nicholas & Stewart 1984
Hunter River Estuary N.S.W., Nicholas &
Stewart 1984, Hodda & Nicholas 1986b.
- Hemicriconemoides cocophilus* (Loof 1949)
Lizard I. Q., Decraemer & Coomans 1978a.

Rhabditidae

- Rhabditis marina* Bastian 1865
Guilderton Beach, Herald Bay, Moore Bay, Dick
Hartog I. W.A., Inglis 1961.

Tylenchidae

- Eutylenchus africanus* Sher, Corbett & Colbran
1966
Lizard I. Q., Decraemer & Coomans 1978a.

Dorylaimida

Nordliidae

- Enchodelus coomansi* Nicholas & Stewart 1984
Hunter and Clyde River Estuary N.S.W.,
Nicholas & Stewart 1984, Hodda & Nicholas
1986b.

Dorylaimidae

- Prodorylaimus apud depressus* Loof 1973.
Lizard I. Q., Decraemer & Coomans 1978a.

Leptonchidae

- Proleptonchus saccatus* (Clark 1962)
Lizard I. Q., Decraemer & Coomans 1978a.

The following generic records new to Australia
were published by Johnston (1938) or Hodda &
Nicholas (1985, 1986, 1987) but without species
records:

Cyatholaimidae, *Pomponema*;

Desmodoridae, *Desmodorella*,
Metachromadoroides;
 Monoposthidae, *Nudora*,
 Molgolaimidae, *Molgolaimus*;
 Leptolaimidae, *Leptolaimus*, *Deontolaimus*;
 Haliplectidae, *Haliplectus*;
 Monhysteridae, *Diplolaimella*, *Diplolaimelloides*;
 Epsilonematidae, *Epsilonematina*;
 Draconematidae, *Drepanonema*;
 Desmoscolecidae, *Greeffella*;
 Xyalidae, *Retrotheristus*, *Filipjeva*,
Metadesmolaimus, *Amphymonhystera*;

Comesomatidae, *Hooperia*;
 Linhomoeidae, *Laimella*;
 Axonolaimidae, *Parodontophora*;
 Diplopeltidae, *Diplopeltis*;
 Dorylaimidae, *Labronema*;
 Oxystominidae, *Thalassolaimus*;
 Tylenchidae, *Tylenchus*.

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INDEX OF AVAILABLE SPECIES GROUP NAMES
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<i>cobbi</i>	<i>Quadricoma</i> 11	<i>granulatus</i>	<i>Mesacanthion</i> 12
<i>cocksi</i>	<i>Phanoderma</i> 12	<i>hackingi</i>	<i>Desmoscolex</i> 10
<i>cocophilus</i>	<i>Hemicriconemoides</i> 14	<i>hartogi</i>	<i>Pontonema</i> 14
			<i>Paracanthonchus</i> 9

<i>haswelli</i>	<i>Draconema</i> 9	<i>nudicaptata</i>	<i>Chromadora</i> 8
<i>heardensis</i>	<i>Enoplus</i> 12	<i>nudus</i>	<i>Desmoscolex</i> 11
<i>heterura</i>	<i>Sabatieria</i> 12	<i>nymphianus</i>	<i>Desmoscolex</i> 11
<i>heterurus</i>	<i>Longicyatholaimus</i> 9	<i>obtusicaudum</i>	<i>Pelagonema</i> 13
<i>hexabulba</i>	<i>Polygastrophorura</i> 14	<i>oceanus</i>	<i>Trissonchulus</i> 13
<i>hirticollis</i>	<i>Sphaerolaimus</i> 10	<i>ocellatum</i>	<i>Phanoderma</i> 12
<i>hoplostoma</i>	<i>Tricoma</i> 11	<i>opisthonchus</i>	<i>Oncholaimus</i> 13
<i>inglisi</i>	<i>Xyzzors</i> 9	<i>ornata</i>	<i>Eurystomina</i> 14
<i>interstitialis</i>	<i>Theristus</i> 10	<i>ovalis</i>	<i>Halichoanolaimus</i> 9
<i>jenseni</i>	<i>Acanthomicrolaimus</i> 9	<i>pachycephala</i>	<i>Tricoma</i> 11
<i>jenseni</i>	<i>Pseudonchus</i> 9	<i>pacifica</i>	<i>Chromadorina</i> 8
<i>johnstoni</i>	<i>Symplocostomella</i> 14	<i>pacifica</i>	<i>Polygastrophora</i> 14
<i>jubata</i>	<i>Sabatieria</i> 12	<i>pacificus</i>	<i>Theristus</i> 10
<i>jungi</i>	<i>Thalassironius</i> 13	<i>palustris</i>	<i>Euteratocephalus</i> 10
<i>kartanum</i>	<i>Paracanthonchus</i> 9	<i>panamaense</i>	<i>Pseudocella</i> 13
<i>kerguelense</i>	<i>Mesacanthion</i> 12	<i>papillata</i>	<i>Quadricoma</i> 11
<i>laevioides</i>	<i>Spirinia</i> 9	<i>papillatus</i>	<i>Sphaerolaimus</i> 10
<i>laevis</i>	<i>Desmoscolex</i> 10	<i>paradoxa</i>	<i>Spilophorella</i> 8
<i>lata</i>	<i>Anticoma</i> 13	<i>parahartogi</i>	<i>Paracanthonchus</i> 9
<i>lata</i>	<i>Daptonema</i> 10	<i>paralangrunensis</i>	<i>Oncholaimus</i> 13
<i>leldyi</i>	<i>Pontonema</i> 14	<i>paraleptus</i>	<i>Desmoscolex</i> 11
<i>leptos</i>	<i>Oncholaimus</i> 13	<i>paralittoralis</i>	<i>Enoplus</i> 12
<i>leptus</i>	<i>Desmoscolex</i> 11	<i>paramacrodon</i>	<i>Paracanthonchus</i> 9
<i>lizardiensis</i>	<i>Ptycholaimellus</i> 8	<i>paramucrodonta</i>	<i>Prochromadorella</i> 8
<i>lizardiensis</i>	<i>Quadricoma</i> 11	<i>paredron</i>	<i>Oncholaimus</i> 13
<i>lizardiensis</i>	<i>Tricoma</i> 11	<i>parva</i>	<i>Atrochromadora</i> 8
<i>longicauda</i>	<i>Araeolaimus</i> 12	<i>pectinatum</i>	<i>Austranema</i> 8
<i>longicaudata</i>	<i>Terschlingia</i> 11	<i>pedroensis</i>	<i>Acanthonchus</i> 9
<i>longicaudatum</i>	<i>Actinonema</i> 8	<i>pedunculata</i>	<i>Quadricomoides</i> 11
<i>longicaudatus</i>	<i>Plectus</i> 10	<i>pellucida</i>	<i>Oxystomina</i> 13
<i>longisetosus</i>	<i>Desmoscolex</i> 11	<i>pellucida</i>	<i>Viscosia</i> 14
<i>longispicula</i>	<i>Tricoma</i> 11	<i>pellucidus</i>	<i>Cryptolaimus</i> 11
<i>longus</i>	<i>Laxus</i> 9	<i>perfectus</i>	<i>Onyx</i> 9
<i>loricata</i>	<i>Steineridora</i> 8	<i>phaustra</i>	<i>Leptosomella</i> 13
<i>macquariensis</i>	<i>Halalaimus</i> 13	<i>platapophysa</i>	<i>Tricoma</i> 11
<i>macquariensis</i>	<i>Paralinhomoeus</i> 11	<i>pristurus</i>	<i>Metoncholaimus</i> 13
<i>macquariensis</i>	<i>Theristus</i> 10	<i>problematicus</i>	<i>Microlaimus</i> 9
<i>macramphida</i>	<i>Viscosia</i> 14	<i>proximus</i>	<i>Paracyatholaimus</i> 9
<i>macrolaima</i>	<i>Chromadora</i> 8	<i>pulchra</i>	<i>Steineria</i> 10
<i>macrolaimoides</i>	<i>Chromadora</i> 8	<i>punctatus</i>	<i>Nicascolaimus</i> 12
<i>margaretae</i>	<i>Paracanthonchus</i> 9	<i>purpureus</i>	<i>Siphonolaimus</i> 11
<i>marina</i>	<i>Monhystrella</i> 10	<i>quadripapillatus</i>	<i>Theristus</i> 10
<i>marina</i>	<i>Rhabditis</i> 14	<i>quattuordecim-</i>	
<i>mawsonae</i>	<i>Prooncholaimus</i> 14	<i>pillatus</i>	<i>Halichoanolaimus</i> 9
<i>mawsoni</i>	<i>Calyptronema</i> 14	<i>riemanni</i>	<i>Tricoma</i> 11
<i>mediterraneum</i>	<i>Phanoderma</i> 12	<i>robustus</i>	<i>Halichoanolaimus</i> 9
<i>megalosoma</i>	<i>Desmodora</i> 9	<i>robynae</i>	<i>Paraphanoderma</i> 12
<i>megastoma</i>	<i>Prooncholaimus</i> 14	<i>rostralis</i>	<i>Tricoma</i> 11
<i>melotridus</i>	<i>Neotonchus</i> 9	<i>rudolfi</i>	<i>Desmoscolex</i> 11
<i>membranosus</i>	<i>Desmoscolex</i> 11	<i>sabangense</i>	<i>Leptosomatium</i> 13
<i>meridionalis</i>	<i>Enoplus</i> 12	<i>saccatus</i>	<i>Proleptonchus</i> 14
<i>metaflebensis</i>	<i>Theristus</i> 10	<i>septuaginta</i>	<i>Tricoma</i> 11
<i>michaelseni</i>	<i>Enoplus</i> 12	<i>serratodentatum</i>	<i>Pontonema</i> 14
<i>micoletzkyi</i>	<i>Leptosomatium</i> 13	<i>serratum</i>	<i>Phanoderma</i> 12
<i>micrognathus</i>	<i>Enoplus</i> 12	<i>setosa</i>	<i>Daptonema</i> 10
<i>microlaima</i>	<i>Atrochromadora</i> 8	<i>setosissima</i>	<i>Steineria</i> 10
<i>minutisculae</i>	<i>Eurystomina</i> 14	<i>setosus</i>	<i>Metalinhomoeus</i> 11
<i>multipapillatus</i>	<i>Ethmolaimus</i> 8	<i>siciliana</i>	<i>Chromadora</i> 8
<i>minor</i>	<i>Chromaodina</i> 8	<i>simile</i>	<i>Comesoma</i> 12
<i>minor</i>	<i>Chromadorita</i> 8	<i>similis</i>	<i>Anticoma</i> 12
<i>minor</i>	<i>Longicyatholaimus</i> 9	<i>similis</i>	<i>Spirinia</i> 9
<i>minutus</i>	<i>Desmoscolex</i> 11	<i>similis</i>	<i>Tricoma</i> 11
<i>mirabilis</i>	<i>Desmotimmia</i> 11	<i>slacksmithi</i>	<i>Ptycholaimellus</i> 8
<i>noffsingerae</i>	<i>Quadricoma</i> 11	<i>spectabilis</i>	<i>Araeolaimus</i> 12

<i>squalus</i>	<i>Metoncholaimoides</i> 13	<i>trichodes</i>	<i>Pseudocella</i> 13
<i>striata</i>	<i>Euchromadora</i> 8	<i>trichura</i>	<i>Anticoma</i> 13
<i>subantarcticus</i>	<i>Oxyonchus</i> 12	<i>trichurus</i>	<i>Longicyatholaimus</i> 9
<i>subsimilis</i>	<i>Anticoma</i> 13	<i>uncinatus</i>	<i>Megadesmolaimus</i> 11
<i>tasmaniensis</i>	<i>Mononcholaimus</i> 13	<i>viridis</i>	<i>Oncholaimus</i> 13
<i>tasmaniensis</i>	<i>Spilophorella</i> 8	<i>viviparus</i>	<i>Acanthonchus</i> 9
<i>tasmaniensis</i>	<i>Thalassomonhystera</i> 10	<i>vulgare</i>	<i>Graphonema</i> 8
<i>tecta</i>	<i>Neochromadora</i> 8	<i>wallini</i>	<i>Neochromadora</i> 8
<i>tenax</i>	<i>Notochaetosoma</i> 9	<i>wieseri</i>	<i>Phanoderma</i> 12
<i>tenua</i>	<i>Pelagonema</i> 14	<i>wieseri</i>	<i>Sabatiera</i> 12
<i>tenuicauda</i>	<i>Tripyla</i> 14	<i>wieseri</i>	<i>Viscosia</i> 14
<i>tenuicolle</i>	<i>Symplocostoma</i> 14	<i>wilsoni</i>	<i>Parapinnanema</i> 8
<i>timmi</i>	<i>Tricoma</i> 11	<i>youngi</i>	<i>Desmoscolex</i> 11

A REVISION OF THE AUSTRALIAN GENUS DIEMENIA SPINOLA (HEMIPTERA : PENTATOMIDAE : PENTATOMINAE)

BY I. AHMAD & S. KAMALUDDIN

Summary

Diemania immarginata (Dallas) and *D. rubromarginata* (Guérin-Méneville) are redescribed in addition to two new species *grossi* from Mt Buffalo and Mt Hotham, eastern Victoria and *minuta* from New England, Victoria, and from Green Hill Estate, South Australia, with special reference to their metathoracic scent auricles and male and female genitalia. *D. rubromarginata rubromarginata* sensu stricto and *D. rubromarginata deyrollei* Spinola, considered as two different subspecies of *D. rubromarginata* (Guérin-Méneville) by Gross (1976) are synonymised. A cladistic analysis of the taxa in the light of the above characters is also included.

A REVISION OF THE AUSTRALIAN GENUS *DIEMENIA* SPINOLA (HEMIPTERA: PENTATOMIDAE: PENTATOMINAE)

I. AHMAD & S. KAMALUDDIN

AHMAD, I & KAMALUDDIN, S. 1989. A revision of the Australian genus *Diemenia* Spinola (Hemiptera: Pentatomidae: Pentatominae) *Rec. S. Aust. Mus.* **23** (1): 21-31.

Diemenia immarginata (Dallas) and *D. rubromarginata* (Guérin-Meneville) are redescribed in addition to two new species *grossi* from Mt Buffalo and Mt Hotham, eastern Victoria and *minuta* from New England, Victoria, and from Green Hill Estate, South Australia, with special reference to their metathoracic scent auricles and male and female genitalia. *D. rubromarginata rubromarginata sensu stricto* and *D. rubromarginata deyrollei* Spinola, considered as two different subspecies of *D. rubromarginata* (Guérin-Meneville) by Gross (1976) are synonymised. A cladistic analysis of the taxa in the light of the above characters is also included.

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Species of *Diemenia* Spinola are Australian in distribution. Gross (1976) speculated that *D. immarginata* (Dallas) might reach New Zealand but we did not find any material from there. Another species, *D. rubromarginata* (Guérin-Meneville), is frequently found as adults and nymphs under eucalyptus bark in the wettest part of South Australia (Gross 1976).

Kirkaldy (1909) catalogued five species, viz. *affinis* (Dallas), *deyrollei* Spinola, *distinctus* (Montandon), *immarginatus* and *rubromarginatus*. Gross (*op. cit.*) examined the type material of the first four and a series of specimens of the fifth, and on this basis considered *affinis*, *deyrollei* and *distinctus* to be junior synonyms of *rubromarginata*. Gross (*op. cit.*) also described and illustrated the male genitalia (pygophore, paramere and partly inflated aedeagus) of *rubromarginata*, compared it with *D. deyrollei*, found no difference and therefore suggested that both represented the subspecies of *D. rubromarginatus*. The former (*D. rubromarginata rubromarginata sensu stricto*) was considered to be the low altitude eastern and southern Australian subspecies).

In this paper *D. rubromarginata deyrollei* is considered to be a junior synonym of *D. rubromarginata rubromarginata*. In addition to *D. rubromarginata* and *D. immarginata*, two new species *D. grossi* and *D. minuta* are described with reference to metathoracic scent complex and male and female genitalia. A key to the four species is given and a cladistic analysis is presented. Dissection and inflation of the male genitalia utilised the technique of Ahmad (1986). For the dissection of the female genitalia, illustrations, and measurements, conventional procedures, especially those used by the present authors (1981), were generally followed. All the measurements are in millimetres.

Genus *Diemenia* Spinola

Diemenia Spinola, 1850, p. 35; Gross, 1976, p. 356.

Type-species: *D. rubromarginata* (Guérin-Meneville) (by monotypy)

Description

Coloration: Generally body dark brown or black with ochraceous patches.

Head: Distinctly broader than long; paraclypei much longer than clypeus but never enclosing the latter, produced into lobe-like structure just above the eyes; anteocular distance distinctly longer than remainder of head; antenniferous tubercles produced anteriorly into spine-like process; antennae with basal segment longer than head apex, 2nd segment much longer than 3rd; labium reaching to hind coxae.

Thorax: Pronotum distinctly more than 2x broader than long, humeral angles prominent, lateral margins serrate; mesosternum sulcate; metathoracic scent gland osiolar peritreme lobe-like, evaporating area rugulose; scutellum longer than broad, triangular; hemelytra with lateral margins sinuate.

Abdomen: Connexiva completely exposed at repose, sometimes tergal sclerites also exposed; 3rd and 4th abdominal venter with rugose vittae.

Male genitalia: Pygophore quadrangular, lateral lobes remarkably long; paramere Y-shaped; aedeagus with pair of many lobed dorsal membranous conjunctival appendage, penial lobes short, about equal to length of vesica.

Female genitalia: First gonocoxae triangular; 9th paratergites lobe-like and shorter than fused eighth paratergites; proctiger with posterior margin concave; spermathecal bulb with finger-like

processes; flanges distinct; pump region longer than bulb; proximal spermathecal duct much longer than distal spermathecal duct.

KEY TO THE SPECIES OF THE GENUS *DIEMENIA*

- 1 — Paraclypeal lobe in front of the eyes small; pygophore with bifurcated dorso-lateral lobes; inner lobe of blade of paramere with a single seta..... *rubromarginata* (Guérin-Ménéville)
- Paraclypeal lobe in front of the eyes more prominent, pygophore with unilobed dorso-lateral lobes; inner lobe of blade of paramere without seta..... 2
- 2 — Entire lateral margins of pronotum distinctly serrate; tergites not exposed at repose; dorso-lateral lobes of pygophore laterally not produced; spermathecal bulb with two finger-like processes..... *grossi* sp. nov.
- Only antero-lateral margins of pronotum serrate; tergites exposed at repose; dorso-lateral lobes of pygophore laterally produced; spermathecal bulb with three finger-like processes..... 3
- 3 — Antecular distance slightly longer than remainder of head; 2nd labial segment shorter than 3rd; dorso-lateral lobes of pygophore beak-like..... *immarginata* (Dallas)
- Antecular distance about $1\frac{1}{2}\times$ length of remainder of head; 2nd labial segment longer than 3rd; dorso-lateral lobes of pygophore lobe-like..... *minuta* sp. nov.

Diemenia grossi sp. nov. (Figs. 1, 5, 9, 13, 17, 21, 25)

Description

Coloration: Body black, except lobe just above the eyes brown, thickly punctate; proximal $\frac{1}{3}$ of 3rd and 4th antennal segments and anterolateral half of pronotum pale; a little anterobasal portion of corium, and each median connexival portion ochraceous; ocelli tinged reddish; eyes brownish black; membrane of hemelytra light brown. Total length of male = 10.2; female = 10.3.

Head: Antecular distance (1.1) slightly more than $1\frac{1}{2}\times$ remainder of head (0.7); paraclypeal lobe just above the eyes more prominent with rounded tips; antenniferous tubercles large with sharply pointed tips; antennae with 2nd segment distinctly more than $3\times$ length of basal segment, length of segments I 0.8 (0.8–0.85), II 2.7 (2.7–2.95), III 1.6, IV 1.7 (1.5–1.7) labium with 4th segment

longer than basal and slightly shorter than 3rd, length of segments, I 0.7 (0.7–0.8) II 1.1 (1.1–1.15), III 1.0 (1.0–1.1), IV 0.9; head width 2.65 (2.6–2.65); interocular distance 1.6; interocellar distance 0.6 (0.6–0.7).

Thorax: Pronotal width 5.0 (4.9–5.0) distinctly more than $2\frac{1}{2}\times$ its length 1.9 (1.7–1.9), entire lateral margins distinctly serrate, anterior angle spinose and not reaching $\frac{1}{2}$ length of eyes, humeral angle acute, (4.9–5.0); scutellum (length 3.5, 3.3–4.5; width 2.9, 2.9–3.0) with distinct apical lobe, metathoracic scent gland ostiolar peritreme (Fig. 5) lobe-like, apex acuminate, anteriorly directed; length base scutellum-apex clavus 2.7 (2.6–2.7); apex clavus-apex corium 2.3 (1.9–2.3); apex corium-apex abdomen including membrane 1.5 (1.5–2.0); apex scutellum-apex abdomen including membrane 3.0 (3.0–3.5).

Abdomen: Postero-lateral margin of 7th abdominal sternum sinuate; entire connexiva exposed at repose.

Male genitalia: Pygophore (Fig. 9) as long as broad, lateral lobe narrowed, elongate, inwardly directed, postero-dorsal margin medially convex; posteroventral margin medially shallowly concave; paramere (Fig. 13) with inner margin of inner lobe of blade convex, apex narrowed; aedeagus (Fig. 17) with dorsal membranous conjunctival appendage bilobed at base, each lobe formed by four-lobed structure, with pair of ventrolateral thecal appendages, vesica short, slightly shorter than penial plates.

Female genitalia (Fig. 21); First gonocoxae large, plate-like, somewhat triangular, medially close to each other; 2nd gonocoxae convex; 9th paratergites narrowed, lobe-like; posterior margins of fused 8th paratergites medially pushed; spermatheca (Fig. 25) with margins of pump region distinctly sinuate, spermathecal bulb with two finger-like processes.

Material examined

Holotype male, New England National Park via Ebor, N.S.W. 22,23–I–1966, B. Cantrell, in Queensland Museum, Brisbane (Reg. No. T. 11, 107). Paratype: 1 female, Green Hill Estate, Fool hills, savannah form Ra. S.A. 24–8–1958, Under bark Mt Lofty, T.E. Woodward, in Department of Entomology, University of Queensland, Brisbane.

Comparative note

Diemenia grossi sp. nov. is most closely related to *immarginata* (Dallas) and *minuta* sp. nov. in having paraclypeal lobe just above the eyes prominent, and inner lobe of blade of paramere without seta but it can easily be separated from both by having entire lateral margin of pronotum distinctly denticulate, spermathecal bulb with two finger-like processes and by other characters as noted in the key and description.

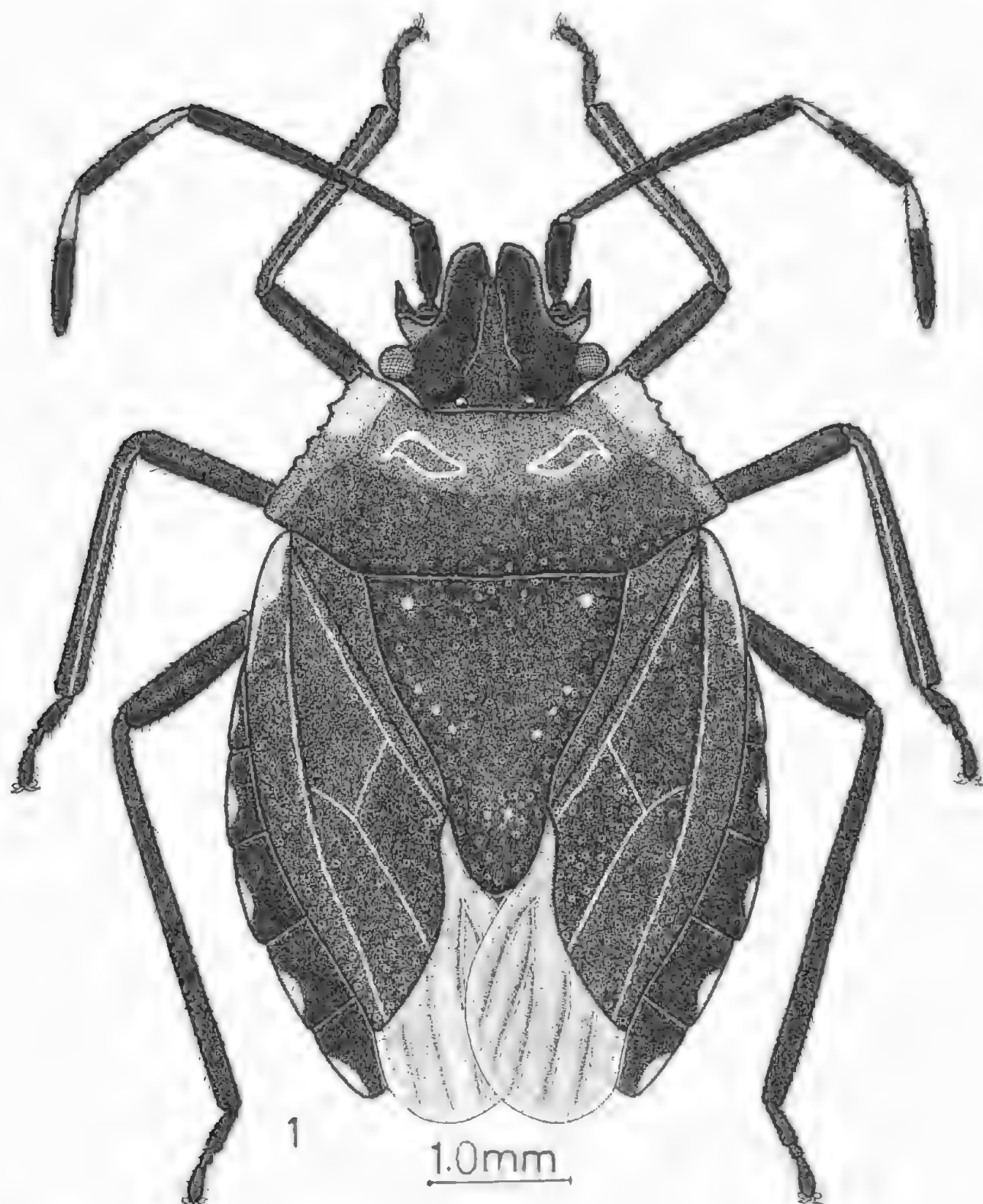


FIGURE 1. *Diemenia grossi*, male, dorsal view

Diemenia immarginata (Dallas)
(Figs 2, 6, 10, 14, 18, 22, 26)

Platycoris immarginatus Dallas, 1851, p. 1
Diemenia immarginata Gross, 1976, p. 363.

Description

Coloration and measurements: Body blackish brown, thickly punctate except narrow lateral margin of paraclypei, antennae with little basal portion of basal and 3rd segment, anterolateral margin of pronotum, scutellum with basal spot at

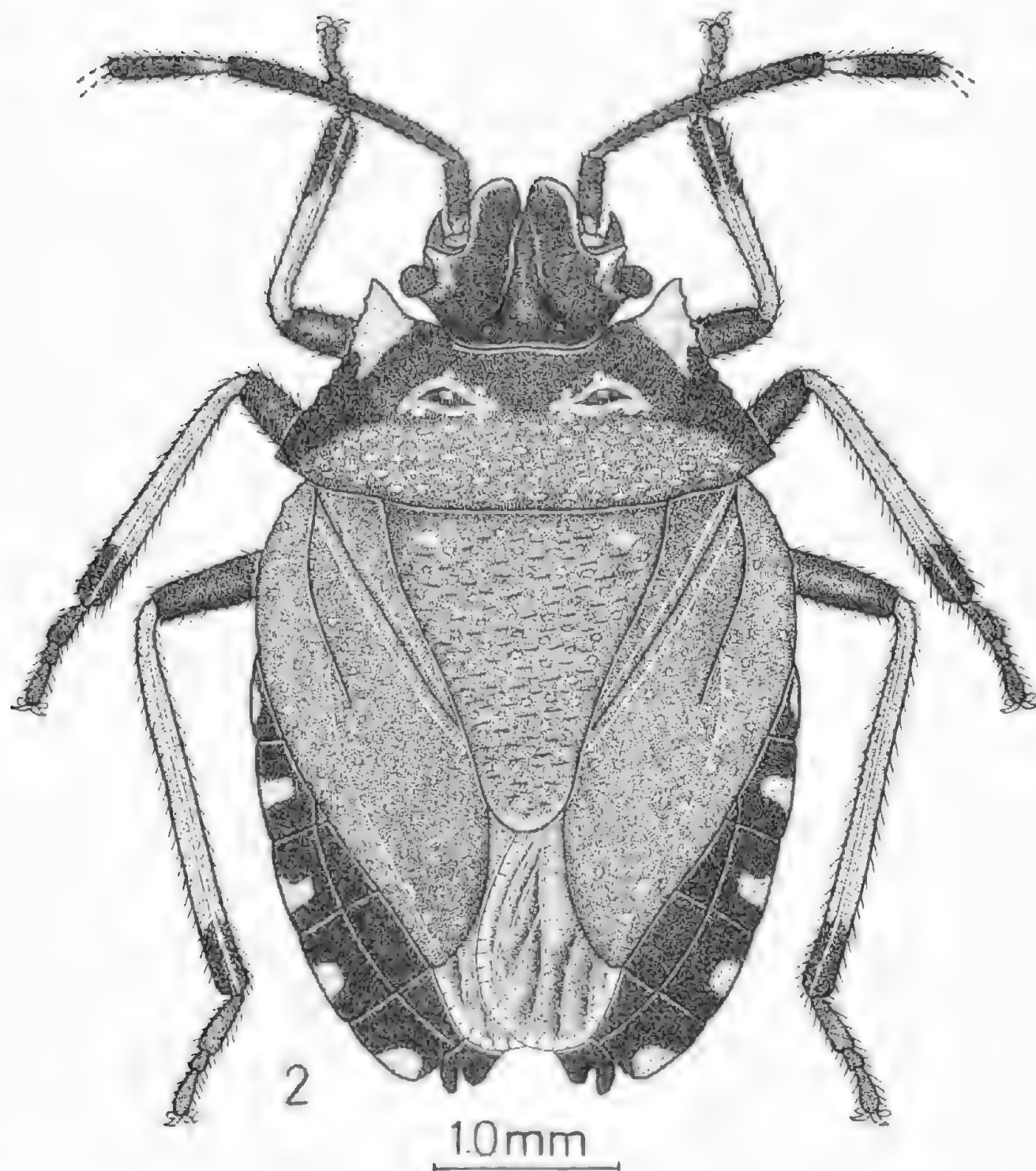


FIGURE 2. *Diemenia immarginata*, male, dorsal view.

each angle and apical little margin, about basal $\frac{1}{3}$ portion of each tibiae and median little portion of each connexival joints light brown; ocelli brown; eyes brownish black; membrane of hemelytra brown. Total length of male = 9.0; female = 10.3.

Head: Antocular distance 0.9 (0.8–0.9) slightly more than remainder of head 0.8 (0.65–0.8); paraclypeal lobe just above the eyes prominent with

rounded tips; antenniferous tubercles large with sharply pointed tips; antennae with 2nd segment about 3× length of basal segment, length of segments, I 0.8 (0.7–0.8), II 2.3 (2.1–2.3), III 1.3 (1.2–1.3), IV mutilated; labium with 4th segment slightly longer than basal and distinctly shorter than 3rd, length of segments, I 0.7 (0.6–0.7), II 0.9, III 1.1 (1.0–1.1), IV 0.8 (0.7–0.8); head width 1.95

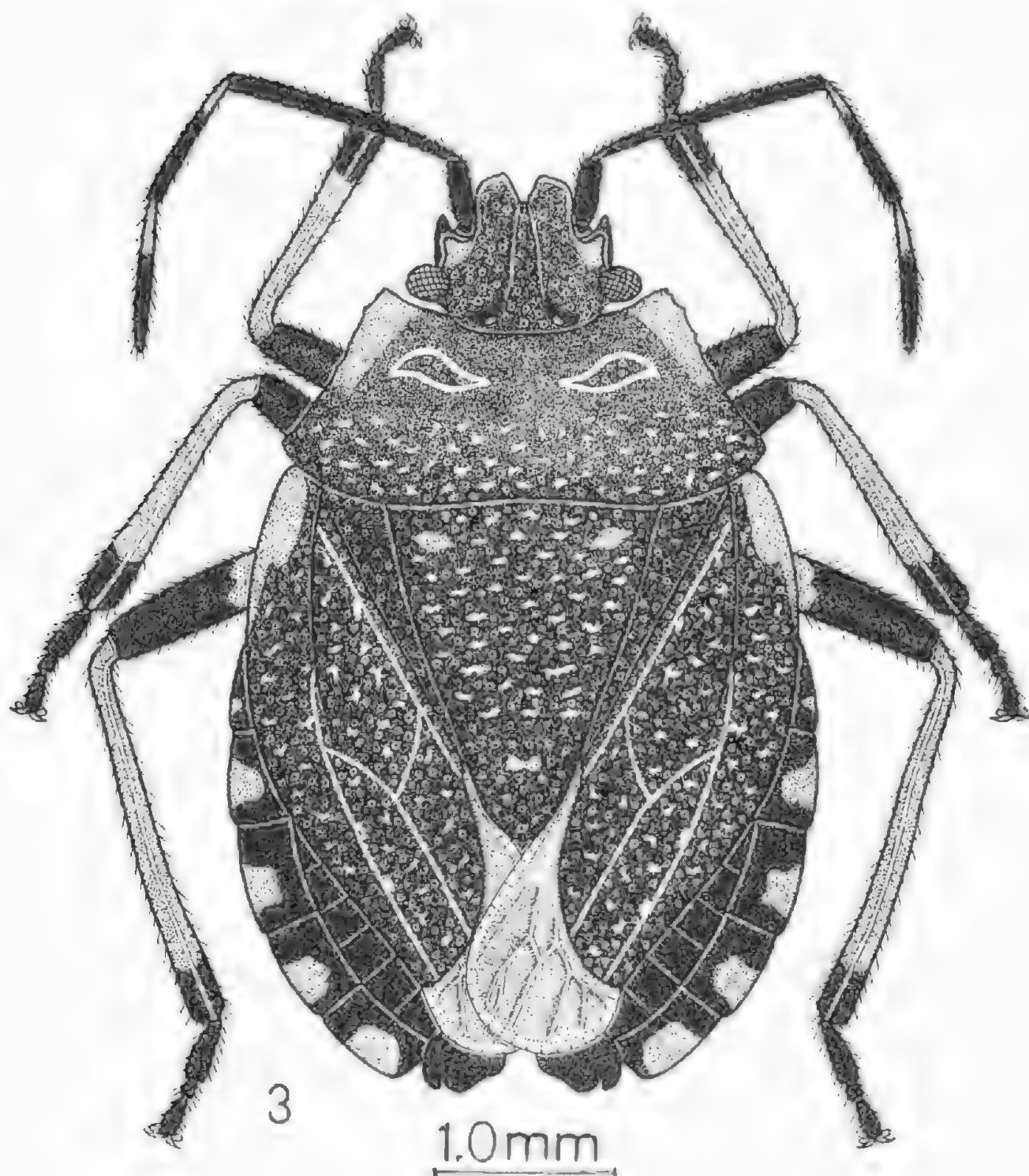


FIGURE 3. *Diemenia minuta*, male dorsal view

(1.95–2.15); interocular distance 1.6 (1.4–1.6); interocellar distance 0.65.

Thorax: Pronotal width 4.6 (4.4–4.6) distinctly more than $2\frac{1}{2} \times$ its length 2.7 (2.65–2.7), anterolateral margin of pronotum dentate, anterior angle produced and passing more than $\frac{1}{2}$ length of eye, humeral angles acute; scutellum (length 3.2, 2.85–3.2; width 2.7, 2.65–2.7) with less distinct apical lobe; metathoracic scent gland ovalar

peritreme (Fig. 6) lobe-like apex round and anterolaterally directed; length base scutellum–apex clavus 2.4 (2.2–2.4); apex clavus–apex corium 2.1 (1.8–2.1); apex corium–apex abdomen including membrane 1.1 (1.1–1.8); apex scutellum–apex abdomen including membrane 2.5 (2.5–2.8).

Abdomen: Postero-lateral margin of 7th abdominal sternum sinuate, entire connexiva and last three tergal segments exposed at repose.

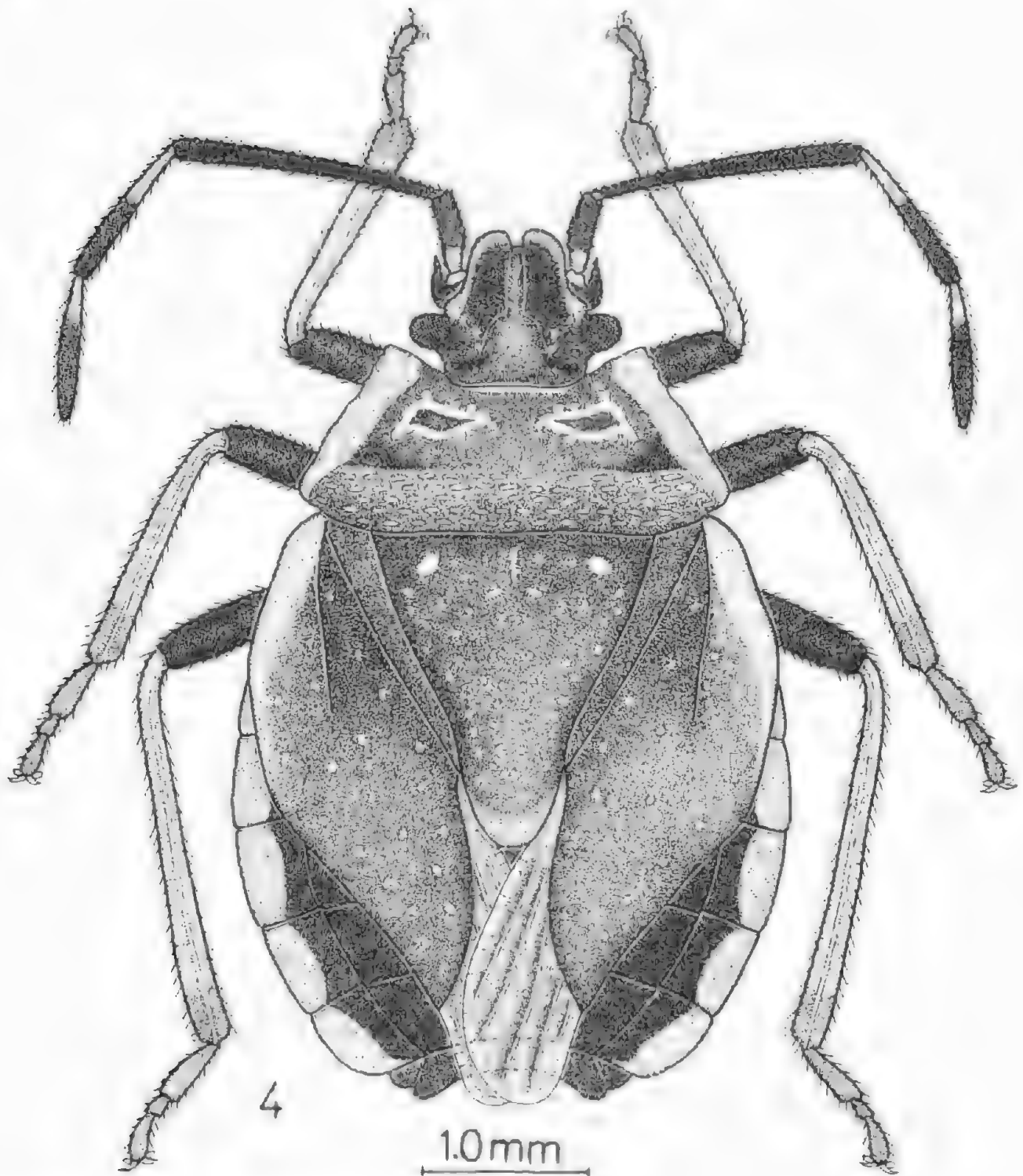
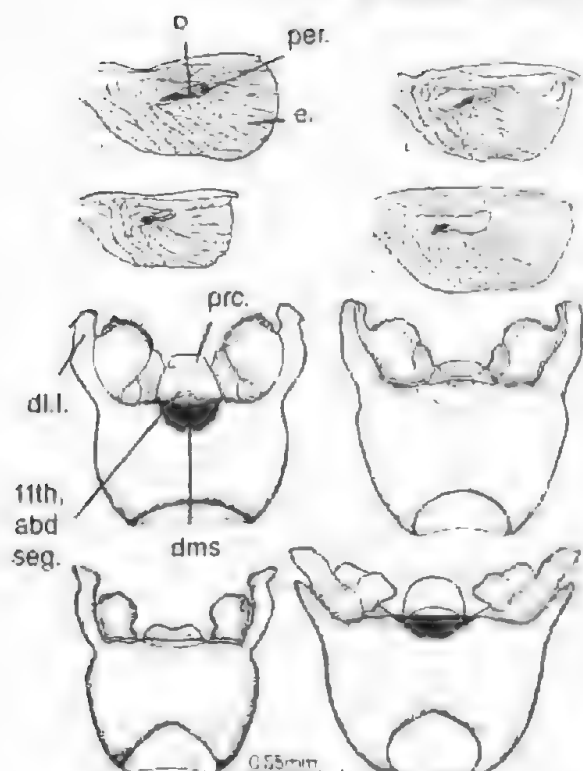


FIGURE 4: *Diemenia rubromarginata*, male, dorsal view.

Male genitalia: Pygophore (Fig. 10) slightly broader than long, lateral lobe narrowed, beak-shaped, outwardly directed, postero-dorsal margin sinuate; paramere (Fig. 14) with inner margin of the inner lobe of blade convex, apex narrowed; aedeagus (Fig. 18) with dorsal membranous conjunctival appendage bilobed at base, each lobe formed by four-lobed structure, with pair of ventro-

lateral thecal appendages, vesica short, slightly shorter than penial plates.

Female genitalia (Fig. 22): First gonocoxae large, plate-like, somewhat triangular, medially close to each other; 2nd gonocoxae concave; 9th paratergites broad, lobe-like; posterior margins of fused 8th paratergites medially slightly concave; spermatheca (Fig. 26) with margins of pump region slightly



FIGURES 5-12. *Diemenia* species: 5-8, metathoracic scent gland ostioles, ventral view; 5, *grossi*, 6, *immarginata*, 7, *minuta*, 8, *rubromarginata*; 9-12, pygophore, dorsal view, 9, *grossi*, 10, *immarginata*, 11, *minuta*, 12, *rubromarginata*. 11th, abd. seg. (Eleventh abdominal segment); dl.l. (dorso-lateral lobe); dms (dorso-median surface); e. (evaporatoria); o. (ostiole); per. (peritreme); prc. (proctiger).

sinuate, spermathecal bulb with three finger-like processes.

Material examined

1 male, Burnie Tas. Lea. det. G.F. Gross 1987, 1 female, Mt. Kosciusko. B. Ingleby. det. G.F. Gross 1987, in South Australian Museum, Adelaide.

Comparative note

Diemenia immarginata (Dallas) is most closely related to *minuta* sp. nov. in having only antero-lateral margins of pronotum denticulate, tergites exposed at repose and spermathecal bulb with three finger-like processes but it can easily be separated from the same by having anteocular distance only slightly longer than remainder of head and lateral lobes of pygophore pointed into a beak-like structure and by other characters as noted in the key and description.

***Diemenia minuta* sp. nov.**
(Figs. 3, 7, 11, 15, 19, 23, 27)

Description

Coloration and measurements: Body ochraceous black, thickly punctate; except narrow lateral

margins of paraclypei, antennae with 1st and 2nd. of proximal $\frac{1}{3}$ of 3rd and 4th segments, anterolateral margins of pronotum, a small spot at each basal angle and on apical lobe of scutellum, antero-lateral patch on corium, proximal $\frac{1}{2}$ of femur, more than proximal $\frac{2}{3}$ of portion of each tibia, median little portion of each connexival suture ochraceous; ocelli tinged red; eyes dark; membrane of hemelytra brown. Total length male = 8.30; female = 9.70.

Head: Anteocular distance 0.9 (0.9-0.95) about $1\frac{1}{2}\times$ length remainder of head 0.6 (0.6-0.65); paraclypeal lobe just above eyes prominently developed with rounded tips; antenniferous tubercles moderate with blunt tips; antennae with 2nd segment equal or slightly longer than $3\times$ length of 1st segment, length of segments I 0.7, II 2.3 (2.1-2.3), III 1.4 (1.2-1.4), IV 1.5; labium with 4th segment equal to 1st and distinctly shorter than 3rd, length of segments, I 0.6 (0.6-0.75), II 1.05 (1.0-1.05), III 1.0, IV 0.6 (0.6-0.75); width head 2.2 (2.2-2.3); interocular distance (1.4, 1.4-1.5); interocellar distance 0.6.

Thorax: Width of pronotum 4.1 (4.1-4.35), about $2\frac{1}{2}\times$ its length 1.6 (1.6-1.8); antero-lateral margin serrate, anterior angle blunt and not reaching $\frac{1}{2}$ length of eyes, humeral angles acute; scutellum (length 2.8, 2.8-3.3; width 2.5, 2.5-2.9) with less distinct apical lobe; metathoracic scent gland ostiolar peritreme (Fig. 7) lobe-like, apex narrowed, anterolaterally directed; length base scutellum-apex clavus 2.2 (2.2-2.6); apex clavus-apex corium 1.9 (1.9-2.1); apex corium-apex abdomen including membrane 0.8 (0.8-1.6); apex scutellum-apex abdomen including membrane 2.4 (2.4-3.0).

Abdomen: Postero-lateral margin of 7th abdominal sternum sinuate; entire connexiva and last three tergal segments exposed at repose.

Male genitalia: Pygophore (Fig. 11) as long as broad; lateral lobe narrowed, elongate, outwardly directed, postero-dorsal margin medially sinuate, postero-ventral margin medially shallowly concave; paramere (Fig. 15) with inner margin of inner lobe of blade convex, apex narrowed and acuminate; aedeagus (Fig. 19) with dorsal membranous conjunctival appendage bilobed at base, each lobe formed by trilobed structure, with pair of ventrolateral thecal appendages, vesica short, slightly shorter than penial plates.

Female genitalia (Fig. 23): First gonocoxae large, plate-like, somewhat triangular, medially close to each other; 2nd gonocoxae straight; 9th paratergites broad, lobe-like; posterior margins of fused 8th paratergites medially slightly concave; spermatheca (Fig. 27) with margins of pump region medially notched, spermathecal bulb with three finger-like processes.

Material examined

Holotype male, Mt Buffalo National Park, east Victoria, 17-1-1966, B. Cantrell, in Queensland Museum, Brisbane (Reg. No. T.11, 106). Paratype: 1 female, Mt Hotham, east Victoria 16-1-1966, T. Weir, Department of Entomology, University of Queensland, Brisbane.

Comparative note

Diamenia minuta sp. nov. is most closely related to *D. immarginata* (Dallas) as noted under the comparative note of that species, but it can easily be separated from the same by having 2nd labial segment longer than 3rd as compared to 2nd labial segment shorter than 3rd in *D. immarginata* and by other characters as noted in the key and description.

Diamenia rubromarginata (Guérin-Ménéville)

(Figs. 4, 8, 12, 16, 20, 24, 28)

Platycoris rubromarginatus Guérin-Ménéville, 1830, p. 169.

Diemenia rubromarginata Gross, 1976, p. 366.

Platycoris distinctus Montandon, 1903, p. 286.

Platycoris affinis Dallas, 1851, p. 154.

Diemenia deyrollei Spinola, 1850, p. 91.

Diemenia rubromarginata deyrollei Spinola (*sic* Signoret) 1850, Gross, 1976, p. 366.

Description

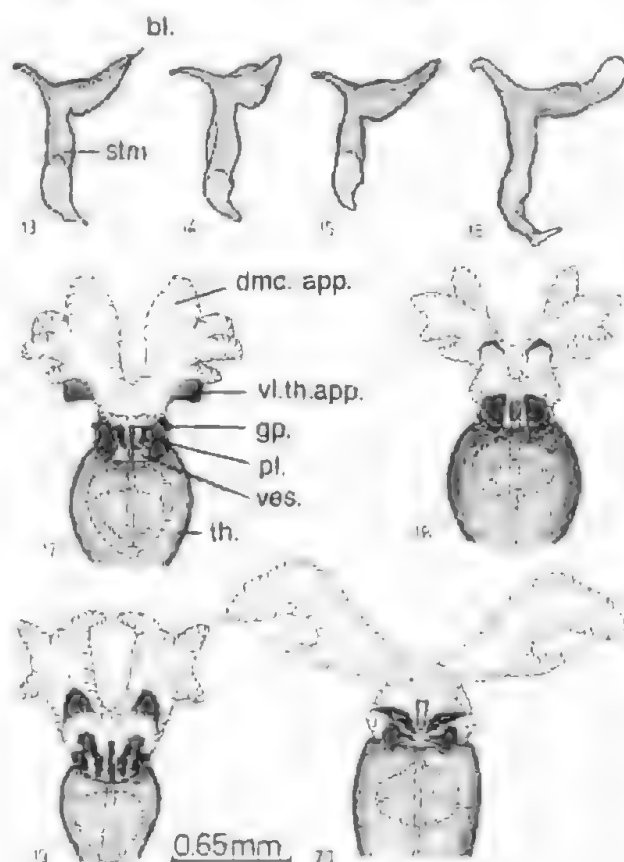
Coloration and measurements: Body dark brown, thickly punctate, except narrow lateral margin of paraclypei, antennae with small basal arch of 1st proximal $\frac{1}{3}$ of 4th and 5th, entire lateral margins of pronotum, one spot at each basal angle of scutellum, proximal half of lateral margin of corium, tibia excluding small distal part, lateral connexival sutures pale; little distal portion of tibia and all tarsi light brown; ocelli tinged reddish; eyes dark brown; membrane of hemelytra brown. Total length male 9.9 (9.15-10.0); female 9.6 (9.4-9.6).

Head: Antecular distance 0.9 (0.85-0.9) slightly longer than remainder of head 0.8 (0.7-0.8); paraclypeal lobe just above the eyes poorly developed with rounded tips; antenniferous tubercles large with sharply pointed tips; antennae with 2nd segment more than $3\times$ length of basal segment; length of segments, I 0.9, II 2.9 (2.9-3.0), III 1.4 (1.4-1.6), IV 1.5; labium with 4th segment distinctly shorter than basal and slightly shorter than 3rd, length of segments, I 1.1, II 1.2, III 1.0, IV 0.9; head width 2.5 (2.35-2.5); interocular distance 1.5 (1.35-1.55), interocellar distance 0.7 (0.7-0.75).

Thorax: Width of pronotum 4.6 (4.3-4.8) distinctly more than $2\frac{1}{2}\times$ its length 1.6 (1.5-2.9); antero-lateral margin serrate, anterior angles acute and much shorter than $\frac{1}{2}$ length of the eyes, humeral angles sub-rounded, scutellum (length 3.1, 2.9-3.3; width 3.0, 2.7-3.0) with distinct apical lobe; metathoracic scent gland ostiolar peritreme (Fig. 8) elongate, spatulate, apex narrowed, anteriorly directed; length base scutellum-apex clavus 2.4 (2.0-2.5); apex clavus-apex corium 2.5 (2.1-2.6); apex corium-apex abdomen including membrane 1.6 (1.4-1.9); apex scutellum-apex abdomen including membrane 3.2 (3.0-3.2).

Abdomen: Postero-lateral margin of 7th abdominal sternum somewhat straight; entire connexiva and last three abdominal terga exposed at repose.

Male genitalia: Pygophore (Fig. 12) much broader than long; lateral lobes narrowed at apex and shorter, postero-dorsal margin medially slightly convex, posteroventral margin deeply concave; paramere (Fig. 16) with inner margin of inner lobe of blade sinuate, apex broad, outer lobe curved



FIGURES 13-20. Parameres, inner view, 13, *grossi*, 14, *immarginata*, 15, *minuta*, 16, *rubromarginata*; 17-20, aedeagus, dorsal view, 17, *grossi*, 18, *immarginata*, 19, *minuta*, 20, *rubromarginata*. bl. (blade); dmc. app. (dorsal membranous conjunctival appendage); gp. (gonopore); pl. (penial lobe); stm. (sternum); th. (theca); ves. (vesica); vl. th. app. (ventro-lateral thecal appendage).

inward, beak-like; aedeagus (Fig. 20) with dorsal membranous conjunctival appendage bilobed at base, each lobe formed by bilobed structure, with pair of ventral thecal appendages, vesica short, about equal to length of penial plates.

Female genitalia (Fig. 24): First gonocoxae large, plate-like, somewhat triangular, medially wide apart; 2nd gonocoxae concave; 9th paratergites narrowed, lobe-like; posterior margins of fused 8th paratergites medially inpushed; spermatheca (Fig. 28) with margins of pump region slightly sinuate, spermathecal bulb with three finger-like processes.

Material examined

1 male, 1 female South Australia, Horsnells Gully, Lower Hermitage, 17.10.1891, 14-18-5-1966, J.W. Mellor, J. Herridge, det. G.F. Gross 1987; 1 male, 1 female Hobart, Tasmania — J.J. Walker collection, in British Museum (Natural History), London; 1 female, Jasmann Loan No. HE 702/84, in Zoological Museum Helsinki, Finland.

Comparative note

Diemenia rubromarginata (Guérin-Ménéville) resembles most *D. immarginata* (Dallas) in having antenniferous tubercles remarkably developed and spine-like and paraclypei much longer than clypeus, but it can easily be separated from all the *Diemenia* species by having paraclypeal lobe just above the eyes less prominent and inner lobe of the blade of paramere with a single seta, and by other characters as noted in the key and description.

CLADISTIC ANALYSIS OF THE INCLUDED TAXA

Ahmad & Kamaluddin (1989) have presented a cladogram of some genera of the *Diemenia* group of Gross (1976) including *Diemenia* and *Niarius*. Here a cladistic analysis of *Diemenia* species is given based upon 14 characters. Polarity was determined on the basis of out-group comparison with the members of the superfamily Pentatomoidea and Trichophora. No homoplasy had to be invoked.

Character and Character States

1. *Lunate patch above ocelli* (a): Ahmad & Kamaluddin (1989) examined representatives of a number of genera of the *Diemenia* group of Gross (1976) and considered it apomorphic. It is a unique condition in the entire Family Pentatomidae and is only found in *Diemenia* and *Niarius* species and therefore is considered here to be their synapomorphy.

2. *Lateral lobes of paraclypei just above the eyes* (b): Ahmad & Kamaluddin (1989) found this condition in those of several genera of the *Diemenia* group and have considered it apomorphic.

Following their reasoning in *grossi*, *immarginata* and *minuta* the condition of more prominent lateral lobes is considered here to be a further derived state (b_2).

3. *Anterior lobes of pronotum produced and directed anterior* (c): It is a rare condition and is noticed in some tetrodines of Phyllocephalinae and Ahmad & Kamaluddin (1988b) have considered it to be apomorphic. Following their reasoning this character state in *immarginata* and *minuta* also reflects their synapomorphy. In *immarginata* the apex of anterior lobes appears narrower and more prominent and probably reflects a more derived state (c_2 in Fig. 29).

4. *Lateral margins of pronotum crenulate* (d): In halyines and some asopines a portion of the lateral margin of pronotum is crenulate like those of lestonocerines which state was considered to be apomorphic by Schaefer & Ahmad (1987). In *Diemenia* and *Niarius* species also this character state looks apomorphic (d). On the other hand the entire lateral margin showing marked crenulations in *grossi* looks to be a more derived state (d_2 in Fig. 29).

5. *Patch on the apical lobe of scutellum* (e): In several groups of Pentatominae including those of *Diemenia* species there is usually a spot on each basal angle of the scutellum but the spot on the apical lobe of the scutellum is very rare and it is certainly apomorphic in *minuta*.

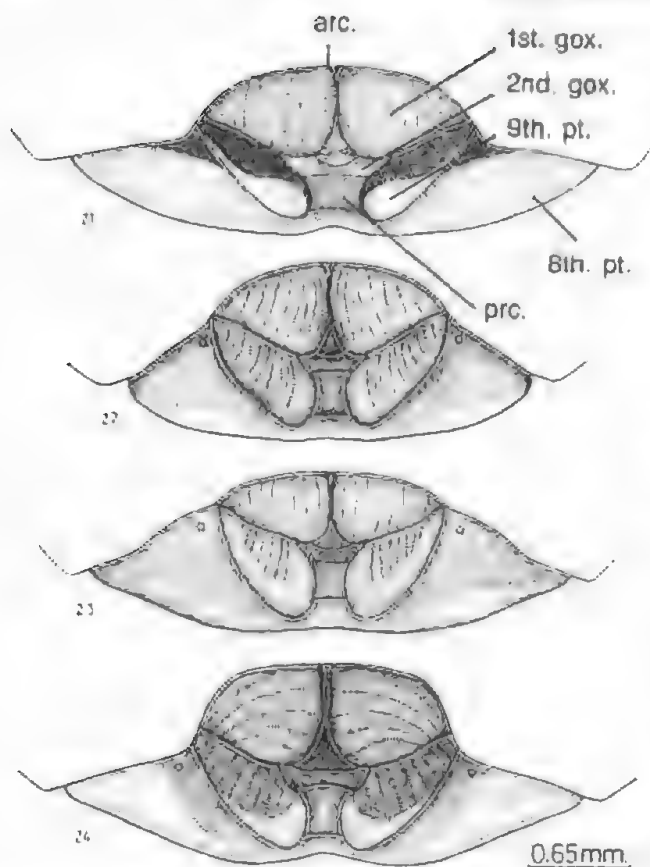
6. *Tibiae sulcate* (f): Sulcated tibiae are encountered in some groups of Trichophora as in coreines and was considered derived by Ahmad (1979). The sulcated tibiae in *Diemenia* species are also considered here to be their autapomorphy.

7. *Tibiae flattened* (g): This character is also remarkably rare in Trichophora as is the case in some coreine Trichophora and it also appears to be an autapomorphy of *Niarius* species.

8. *Sides of abdomen exposed* (h): In most of the Pentatominae only a small portion of connexiva is exposed but in *Diemenia* species not only the entire connexiva are exposed but the sides of the abdomen are also in some cases exposed. This is certainly autapomorphy of the group.

9. *Dorsolateral lobes of pygophore remarkably prominent* (i): This appears a rare character in Pentatominae. Ahmad & Kamaluddin (1989) also considered it apomorphic in certain genera of the *Diemenia* group. Laterally directed tips of these lobes appear more derived in *immarginata* and *minuta* (i_2). In *minuta* however the laterally directed portion is remarkably prominent and this state appears to be further derived (i_3 in Fig. 29).

10. *Outer margin of paramere with an arch-shaped tooth-like structure* (j): This is a rare condition in Pentatominae and Ahmad & Kamaluddin (1989)



FIGURES 21-24, Female terminalia, ventral view, 21, *grossi*, 22, *immarginata*, 23, *minuta*, 24, *rubromarginata*. 1st gox. (first gonocoxae); 2nd. gox. (second gonocoxae); 8th. pt. (eighth paratergite); 9th. pt. (ninth paratergite); arc. (arcus); prc. (proctiger),

also considered it synapomorphy of some genera of the *Diemenia* group. In *immarginata* this lobe appears slender, more elongate and acute at the apex and reflects a more derived state (j_2 in Fig. 29). In *rubromarginata* however the apex of the outer lobe is recurved which looks to be a further derived condition (j_3 in Fig. 29).

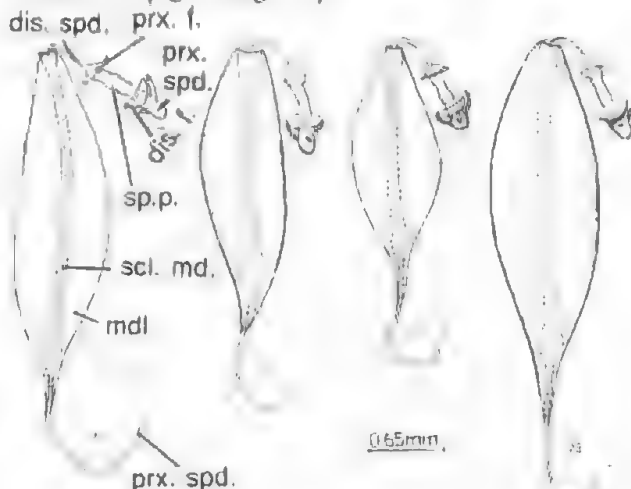
11. *Base of inner lobe of paramere with a bristle* (k): This is an extremely rare condition in Pentatominae and is only found in *D. rubromarginata* which is considered here to be its autapomorphy.

12. *Dorsal membranous conjunctival appendage multilobed* (l): In most of the Pentatominae the dorsal membranous conjunctival appendage is bilobed (Ahmad 1979). In *rubromarginata* each lobe is divided into two lobules which is certainly a derived state in this species. In *grossi*, *immarginata* and *minuta* each lobe is divided into several lobules which appears to be a further derived condition (l_2 in Fig. 29).

13. *Ovipositor partly concealed by 1st gonocoxae* (m): In Pyrrhocoroidea, Ahmad & Schaefer (in manuscript) have considered partly concealed external genitalia to be an apomorphic state because it is very rare in Trichophora. Following their

reasoning in *Niarius* species the ovipositor partly concealed by the first gonocoxae is considered here to be an autapomorphy of the group.

14. *Spermathecal bulb with finger-like processes* (n): In some groups of Pentatominae the spermathecal bulb possesses finger-like processes which were considered to be apomorphic by Ahmad & Kamaluddin (1989). Following their argument, possession of three processes in most of the *Diemenia* species (one or two processes in *Niarius* species) is considered here to be a more derived condition (n_2 in Fig. 29).



FIGURES 25-28. Spermatheca, 25, *grossi*, 26, *immarginata*, 27, *minuta*, 28, *rubromarginata*, dis. f. (distal flange); dis. spd. (distal spermathecal duct); mdl. (median dilation); pr. spb. (process of spermathecal bulb); prx. f. (proximal flange); prx. spd. (proximal spermathecal duct); scl. md. (sclerotized median duct); spb. (spermathecal bulb); sp.p. (spermathecal pump).

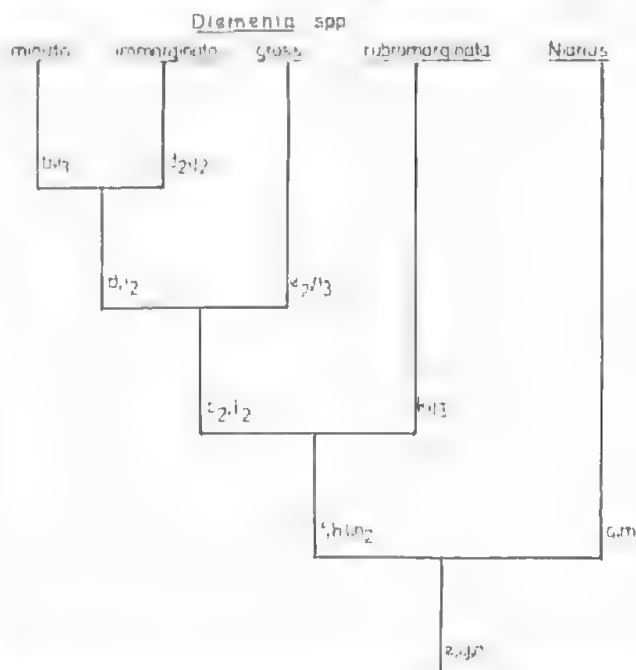


FIGURE 29. Cladogram of relationships between species of *Diemenia*.

Discussion of Cladogram

Ahmad & Kamaluddin (1989) also considered *Niarius* and *Diemenia* species to be sister groups. *D. rubromarginata* appears isolated among the *Diemenia* species in having sister group relationship with *grossi*, *immarginata* and *minuta*. On the other hand *minuta* and *marginata* appear most closely related, and *grossi* to be their sister group. The anteriorly directed anterior lobes of the pronotum and laterally directed dorsolateral lobes of the

pygophore suggest that the two species are most closely related, and the complex multilobed dorsal membranous conjunctival appendages and more prominent lateral lobes of the paraclypei above the eyes, confirm the sister group relationship of *grossi* with *immarginata* and *minuta*.

ACKNOWLEDGMENT

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**A NEW GENUS AND SPECIES OF THE DIEMENIA GROUP (HEMIPTERA
: PENTATOMIDAE : PENTATOMINAE) FROM AUSTRALIA, WITH
CLADISTIC ANALYSIS OF SOME RELATED GENERA**

BY I. AHMAD & S. KAMALUDDIN

Summary

A new genus and species from 'St Emlyn', Australia, are described with special reference to their metathoracic scent auricles and male and female genitalia. The new taxa are compared with their closest allies of *Diemenia* Spinola, and *Niarius* Stal in the *Diemenia* group of Gross (1976) and a cladistic analysis of the genera of the above group is presented.

A NEW GENUS AND SPECIES OF THE *DIEMENIA* GROUP (HEMIPTERA: PENTATOMIDAE: PENTATOMINAE) FROM AUSTRALIA, WITH CLADISTIC ANALYSIS OF SOME RELATED GENERA

I. AHMAD & S. KAMALUDDIN

AHMAD, I. & KAMALUDDIN, S. 1989. A new genus and species of the *Diemenia* group (Hemiptera: Pentatomidae: Pentatominae) from Australia with cladistic analysis of some related genera. *Rec. S. Aust. Mus.* 23 (1): 33-38.

A new genus and species from 'Mt Emlyn', Australia, are described with special reference to their metathoracic scent auricles and male and female genitalia. The new taxa are compared with their closest allies of *Diemenia* Spinola, and *Niarius* Stål in the *Diemenia* group of Gross (1976) and a cladistic analysis of the related genera of the above group is presented.

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Gross (1976) described his *Diemenia* group with the characteristic feature of strigose vittae forming a curved line laterally on the abdomen on segments II, III, and IV, or II and III, or III and IV to accommodate aberrant groups like his *Boocoris*, *Alphenor* Stål and *Caridophthalmus* Assman along with *Diemenia* Spinola, *Niarius* Stål and *Apterotus* Dallas and four others with five-segmented antennae. Ahmed *et al.* (1982) suspected that the strigose vittae which link the members of Diemeniini Kirkaldy or the *Diemenia* group are shared by the members of remarkably diverse groups. Earlier Bergroth (1905) also recognised two different patterns of strigose vittae, viz. arranged in a single straight row in the members of *Commus* Stål and *Oncocoris* Mayr and in two or three irregular rows in *Diemenia* and *Niarius*. Gross (1976) also considered strigose vittae of *Caridophthalmus* species very different from those of *Boocoris*.

During a revision of *Niarius* and *Diemenia* (present authors in manuscript), we examined a male and a female specimen from 'Mt Emlyn', Australia by the courtesy of Dr A. Neboiss, Museum of Victoria. These looked intermediate between *Diemenia* and *Niarius* in the characters as noted under the following comparative note and cladistic analysis. The resemblance to the above two genera was so striking that the male was identified as *Niarius* or an allied new genus and the female as *Diemenia* (sp. nov.) by Dr G.F. Gross of the South Australian Museum, Adelaide. These are described below as *Grossimenia* with its type species *tuberculata* with special reference to the metathoracic scent auricles and male and female genitalia. It is compared with its closest allies *Diemenia*, *Niarius* and *Apterotus*, and in the light of these characters a cladistic analysis of related genera of the *Diemenia* group is also presented.

For the examination of the male genitalia and especially for the inflation of the aedeagus, the techniques of Ahmad (1986) were used. For the

examination of the female genitalia and for descriptions, illustrations and for measurements the conventional procedures especially those used by Ahmad *et al.* (1982) were generally followed. All the measurements are in millimetres.

Genus *Grossimenia* gen. nov.

Type-species: *Grossimenia tuberculata* sp. nov.

Description

Coloration and general shape: Generally dark brown with ochraceous patches; elongate, covered with tubercles.

Head: Slightly longer than broad; eyes nonsty-
late, paraclypei shorter than clypeus, forming a lobe in front of the eyes; anteocular distance much longer than remainder of head; antenniferous tubercles visible from above, laterally slightly projected and pointed but not spinously produced; antennae four-segmented, with 1st segment shorter than head, 2nd segment longest and much longer than 3rd; labium very long, reaching to 7th abdominal venter.

Thorax: Pronotum slightly more than 2 × broader than long, humeral angles sub-rounded, lateral margins serrate; scutellum elongate, much longer than broad; antero-lateral margins of corium crenulate, meso-sternum sulcate; metathoracic scent auricles spatulate, evaporating area distinctly rugulose; hind femora armed with several spines.

Abdomen: Connexiva exposed at repose; 3rd and 4th abdominal venter with strigose vittae.

Male genitalia: Pygophore quadrangular, lateral lobes large and narrowed at apex; paramere T-shaped; aedeagus with bilobed dorsal membranous conjunctival appendage, vesica short.

Female genitalia: First gonocoxae somewhat triangular; 9th paratergites triangular with apices narrowed, much shorter than fused posterior margin of 8th paratergites.

Etymology

The new genus is named *Grossimenia* in honour of Dr G.F. Gross, South Australian Museum, who originally recognised the taxon to be near *Diemenia* and *Niurius*.

Comparative note

Grossimenia is closely allied to *Niurius* in having only the connexiva exposed at repose and the outer lobe of the paramere small, and to *Diemenia* in having the lateral margins of the pronotum always serrate. It can be separated from both in having the body elongate, paraclypei shorter than the clypeus and labium very long, reaching to 7th abdominal venter.

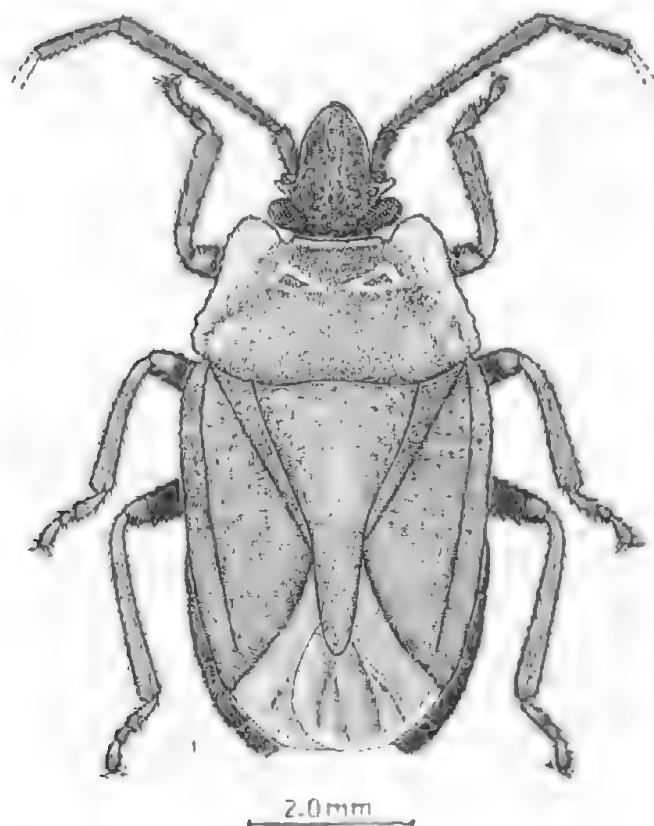


FIGURE 1, *Grossimenia tuberculata*.

Grossimenia tuberculata sp. nov.
(Fig. 1-6)

Description

Coloration and measurements: Dark brown except narrow lateral margins of paraclypei and lateral margins of pronotum; three basal spots on scutellum; apex of femora, basal portion of tibiae and tarsi, ochraceous; eyes blackish brown; ocelli brownish; membrane of hemelytra light brown. Total length male = 7.35; female = 8.45.

Head: Paraclypei with apex acuminate,

paraclypeal lobe just above the eyes prominent, lobe-like; antocular distance 1.15 (1.15-1.25) about or more than $2\frac{1}{2} \times$ length of remainder of head 0.4 (0.4-0.5); width of head 1.5 (1.5-1.76); interocular distance 1.0 (1.0-1.05), interocellar distance 0.5 (0.5-0.55); antennae with basal segment much shorter than head length and $\frac{1}{3}$ of 2nd, length of segments, I 0.55 (0.55-0.6), II 1.9 (1.8-1.9), III 1.1 (1.05-1.1), IV mutilated; labium with 2nd segment longest, 4th shortest, length of segments; I 1.4; II 1.6 (1.6-1.9), III 1.5 (1.5-1.6), IV 1.1 (1.0-1.1).

Thorax: Pronotum with anterior and humeral angles broad, length 1.5 (1.5-1.6); width 3.1 (3.1-3.4); scutellum laterally distinctly bilobed, apex acuminate, length 3.1 (3.1-3.7); width 1.9 (1.9-2.0); metathoracic scent gland ostiolar peritreme (Fig. 2) lobe-like, anterior margin sinuate, apex narrowed, acuminate, directed laterad; with spines; membrane of hemelytra shorter than abdomen; distance base scutellum-apex clavus 1.9 (1.9-2.1); apex clavus-apex corium 1.3 (1.3-1.7); apex corium-apex abdomen including membrane 0.9 (0.9-1.1); apex scutellum-apex abdomen including membrane 1.2 (1.2-1.4).

Abdomen: Connexiva slightly exposed at repose; anterolateral margin of 7th abdominal sternum sub-rounded.

Male genitalia: Pygophore (Fig. 3) broader than long, dorso-median surface medially slightly produced and straight, ventro-posterior margin medially deeply inpushed, lateral lobes elongate with apex narrowed, lateral margins sinuate; paramere (Fig. 4) with inner arm broad, apex narrowed, outer arm curved, spine-like, outer margin sinuate; aedeagus (Fig. 5) with tips of bilobed dorsal membranous conjunctival appendage sclerotized, penial lobes large, plate-like, vesica not reaching fused margin of bilobed dorsal membranous conjunctival appendage.

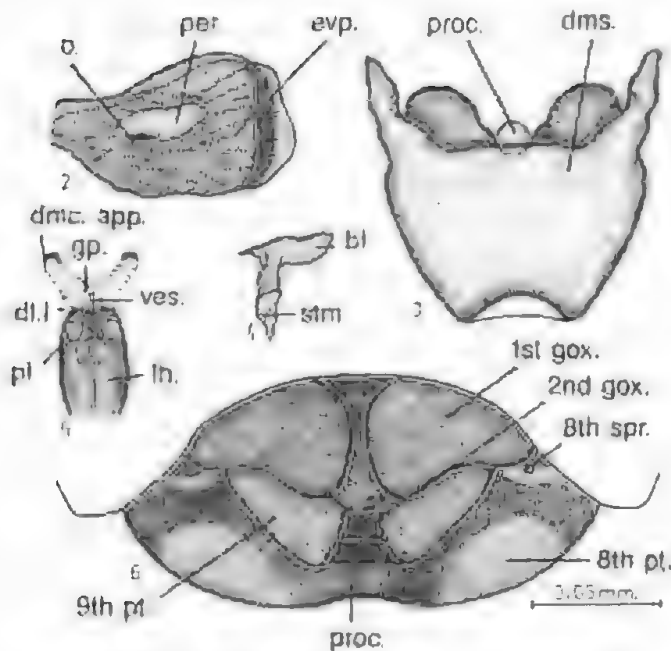
Female genitalia (Fig. 6): First gonocoxae large, plate-like, posterior margin distinctly sinuate; 9th paratergites elongate; posterior margin of fused arcus and triangulin convex; 2nd gonocoxae posteriorly concave; posterior margin of proclitiger straight, fused posterior margin of 8th paratergites medially inpushed.

Material examined:

Holotype male, Australia 'Mt Emlyn' — Q, 12.5. 1937 in National Museum of Victoria. Paratype female, same data, in National Museum of Victoria.

Comparative note and etymology:

At present it is the only known species of *Grossimenia* gen. nov. but its tuberculate body, from which its name is derived, should isolate it in its genus.



FIGURES 2-6. *Grossimenia tuberculata*: 2, metathoracic scent gland ostioles, ventral view; 3, pygophore, dorsal view; 4, paramere, inner view; 5, aedeagus, dorsal view; 6, female genitalia, ventral view. 1st gox. (first gonocoxae); 2nd gox. (second gonocoxae); 8th pt. (eighth paratergite); 8th spr. (eighth spiracle); 9th pt. (ninth paratergite); arc. (arcus); bl. (blade); dl. l. (dorsal-lateral lobe); dms. app. (dorsal membranous conjunctival appendage); dms. (dorso-median surface); evp. (evaporatoria); gp. (gonopore); o. (ostile); per. (preitreme); pl. (penial lobe); proc. (proclitiger); stm. (stem); th. (theca); ves. (vesica).

CLADISTIC ANALYSIS OF THE TAXA INCLUDED

The present authors have recently completed (in manuscript) a revision of *Diemenia* and *Niarius*. Earlier (1982) they have also revised *Aplerotus* of this group. Gross (1976) has described with beautiful illustrations the genera of his *Diemenia* group. In this light a cladistic analysis of those genera of the *Diemenia* group which have four-segmented antennae is presented. In all, 27 characters, the polarities of which could not unreasonably be deduced, are analysed. No homoplasy had to be invoked.

Characters and Character States

1. *Body patterned* (a): Remarkably patterned body with a prominent transverse luteous stripe at about the level of the apex of scutellum in the members of *Aplerotus* is unique and it is certainly apomorphic, similar to the colour patterns encountered in strachiine Pentatomidae which is also an apomorphic condition.

2. *Body oblongate* (b): Pentatomidae are usually oval but elongate (e.g. *Mecidea* Stål) or oblongate (some halyine) - bodied species are very rare and

we consider this character of *Grossimenia* apomorphic.

3. *Lateral margins of head produced in front of eyes* (c): This appears to be a unique condition in the entire Pentatominae and is therefore certainly an apomorphy. In *Diemenia*, *Grossimenia*, *Niarius* and *Gilippus* species it is very small and lies just in front of the eye, but in *Alphenor* species it extends into an upwardly directed acute lobe lying from just in front of the eyes and thrown up into an erect triangular tooth-like process over the antennifers. The latter condition appears therefore to be a more derived state (c_2 in Fig. 7). In *Boocoris* and *Aplerotus* species this process appears to have been secondarily lost (c_3 in Fig. 7).

4. *Eyes stylate* (d): Throughout Heteroptera the eyes are usually nonstylate, but pedunculate eyes do occur independently in some groups of Trichophora such as in geocorine Lygaeidae, in some largiline Largidae and strachiine Pentatomidae. This condition is certainly apomorphic. *Boocoris* and *Aplerotus* species have slightly or distinctly stylate eyes and appear related, but remarkably pedunculate small eyes also occur in *Gilippus* sp. which appear to be its autapomorphy, but it must have been developed independently.

5. *Antennifers prominent* (e): In Pentatomoidea the antennifers are usually unspinose but in some groups of Podopini such as in *Stortheocoris* species, the antennifers are spinose and prominent which is their apomorphy. Similarly all the genera treated in the *Diemenia* group by Gross (1976) have prominent antennifers, mostly spinose, which reflects their synapomorphy but in *Alphenor* species each antennifer is produced into a cordate flat process which appears to be a further derived condition (e_2 in Fig. 7).

6. *Lunate patch in front of ocelli* (f): Unicolourous body is plesiomorphic and in this light the marked dark lunate patch in front of ocelli in *Diemenia* and *Niarius* species is apomorphic.

7. *Broad and medially notched apical margins of paraclypei* (g): In Pentatomidae the paraclypei are round or acute, but broad, truncate or medially notched paraclypei are extremely rare and therefore we consider it autapomorphy of *Gilippus* species.

8. *Antennae four-segmented* (h): In Pentatomoidea the occurrence of five-segmented antennae is very common and must be regarded as plesiomorphic. The occasional four-segmented antennae which occur in some halyines are considered neotenic and therefore apomorphic (Slater pers. comm.).

9. *Second antennal segment remarkably longer than each of the other antennal segments* (i): This is also an extremely rare condition in Pentatominae and probably represents synapomorphies of the presently treated genera (Fig. 7) following Ahmad & Afzal (1988).

21. *Median projection of Pygophore (u)*: The dorso-posterior margin of the pygophore in the majority of the Pentatomidae is smoothly concave. The prominent trilobed median projection in *Apterotus* species certainly reflects the autapomorphy of the genus.

22. *Dorsolateral processes of pygophore prominent (v)*: These processes are usually rounded in the Pentatomidae but in some advanced Pentatominae, as in some halyines, these are prominent. In *Niarius* and *Grossimenia* species (and also probably in *Alphenor* species whose male genitalia are unknown), these processes are markedly prominent and elongate which condition represents their synapomorphy. In *Diemenia* species, however, these processes are remarkably elongate and apically curved. This feature represents a further derived state (v_2 in Fig. 7).

23. *Paramere with outer spine of the blade prominent (w)*: In the species of three genera viz. *Grossimenia*, *Niarius* and *Diemenia*, there is a spine on the outer surface of the blade which is very rare in the Pentatominae and represents synapomorphy of the group. In *Grossimenia* sp. the spine is transversely directed and is slightly below the level of the apex of the short blade which gives a T-like appearance to the paramere. In *Niarius* and *Diemenia* species the spine is arch-like and is at the level of the apex of the blade, which is a more derived character and gives it an L- or y- shape (w_2 in Fig. 7). In *Diemenia* species the spine is distinctly more pronounced and gives the paramere a y-shaped appearance, which is considered here to be further derived (w_3 in Fig. 7).

24. *Complex dorsal membranous and other sclerotised conjunctival appendages (x)*: The dorsal membranous conjunctival appendages in the majority of the Pentatomidae is simple, and bilobed as in *Niarius* and in *Grossimenia* species. In *Diemenia* species it is usually very complicated, many-branched and reflects autapomorphy. In *Apterotus* species the presence of many sclerotised conjunctival appendages reflects a further derived condition (x_2 in Fig. 7).

25. *First gonocoxae concealing most of the remaining parts of ovipositor (y)*: In the Trichophora the genitalia are usually exposed but in the Pyrrhocoroidea these appear concealed, which condition was considered apomorphic by Ahmad & Schaefer (in manuscript). Following that argument the concealment of most of the ovipositor

by the first gonocoxae in *Niarius* species is certainly an apomorphic state.

26. *Spermathecal bulb markedly elongate (z)*: In the Pentatomidae the spermathecal bulb is usually oval or oblong, which condition reflects plesiomorphy, but in *Niarius* species the spermathecal bulb is usually elongate and slender which is certainly a derived state.

27. *Processes on the spermathecal bulb (aa)*: In primitive Pentatomoidea (Ahmad 1979) the spermathecal bulb is usually simple without finger-like processes but in some groups of advanced Pentatomidae such as in Carpocorini and Halyini, finger-like processes are present on the spermathecal bulb, which represents the apomorphic state similar to that in *Diemenia* and *Niarius* species. When the spermathecae of *Grossimenia* and *Alphenor* species become available they may also be found to possess these processes.

Discussion of Cladogram (Figure 7)

Gilippus (with five-segmented antennae) exhibits sister group relationships with the above genera of the *Diemenia* group (having four-segmented antennae) in possessing lateral lobes on the head in front of the eyes. The cladogram predicts that the spermatheca of *Grossimenia*, and also probably of *Alphenor*, will be found to possess finger-like processes on the spermathecal bulb.

The genera *Apterotus* and *Boocoris* apparently form a group in exhibiting loss of the lateral process of the head in front of the eyes, and in the crenulation of the lateral margins of the pronotum. Similarly the eyes in both are on upwardly and slightly outwardly directed peduncles. In *Gilippus* species the eyes are also pedunculate, but here the eyes are small and the stalk appears more prolonged and must be considered of a different type.

The cladogram shows *Niarius*, *Diemenia* and *Grossimenia* closely related and *Alphenor* to exhibit a sister group relationship with these genera. The male genitalia of *Alphenor* are unknown but the cladogram predicts that when these become available they will be found to possess lateral lobes of the pygophore.

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A REASSESSMENT OF THE AUSTRALIAN SPECIES OF MENEPHILUS MULSANT (COLEOPTERA : TENEBRIONIDAE) WITH DESCRIPTIONS OF TWO NEW GENERA AND A LARVA AND PUPA

BY E. G. MATTHEWS & J. T. DOYEN

Summary

Among the Australian species previously assembled under the generic name *Menephilus* Mulsant are three natural genera. One is *Tetragonomenes* Chevrolat (Coelometopinae) with five named Australian species not revised here. Two are new and described as *Kaszaba* gen. nov. (Coelometopinae) and *Bassianus* gen. nov. (Tenebrioninae), each with four named species. New combinations are : *Tetragonomenes aeneus* (Carter), *T. azuripennis* (Carter) and *T. ruficornis* (Champion); *Kaszaba coerulescens* (Haag-Rutenberg), *K. corvina* (Erichson), *K. laeta* (Carter) and *K. pulchra* (Carter) ; *Bassianus colydioides* (Erichson), *B. humilis* (Erichson), *B. rectibasis* (Carter) and *B. sydneyanus* (Blackburn). *B. armstrongi* (Carter) is newly synonymised with *colydioides* (Erichson). The affinities of the new genera are discussed and their species keyed and briefly reviewed. The larva of *Bassianus rectibasis* and the pupa of *B. sydneyanus* are described and compared with larvae of related genera and the tribe Heleini.

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E. G. MATTHEWS & J. T. DOYEN

MATTHEWS, E.G. & DOYEN, J.T. 1989. A reassessment of the Australian species of *Menephilus* Mulsant (Coleoptera: Tenebrionidae) with descriptions of two new genera and a larva and pupa. *Rec. S. Aust. Mus.* 23(1): 39-50.

Among the Australian species previously assembled under the generic name *Menephilus* Mulsant are three natural genera. One is *Tetragonomenes* Chevrolat (Coelometopinae) with five named Australian species not revised here. Two are new and described as *Kaszaba* gen. nov. (Coelometopinae) and *Bassianus* gen. nov. (Tenebrioninae), each with four named species. New combinations are: *Tetragonomenes aeneus* (Carter), *T. azuripennis* (Carter) and *T. ruficornis* (Champion); *Kaszaba coerulescens* (Haag-Rutenberg), *K. corvina* (Erichson), *K. laeta* (Carter) and *K. pulchra* (Carter); *Bassianus colydioides* (Erichson), *B. humilis* (Erichson), *B. rectibasis* (Carter) and *B. sydneyanus* (Blackburn). *B. armstrongi* (Carter) is newly synonymised with *colydioides* (Erichson). The affinities of the new genera are discussed and their species keyed and briefly reviewed. The larva of *Bassianus rectibasis* and the pupa of *B. sydneyanus* are described and compared with larvae of related genera and the tribe Heleini.

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Confusion has attended the use of the generic name *Menephilus* Mulsant in Australia from its first application by Macleay (1872) to his new *parvulus* (= *colydioides* Erichson) and to *nigerrimus* Boisduval (a *nomen dubium* possibly in the genus *Zophophilus* Fairmaire). Altogether, species belonging to five different genera have at one time or another been described in, or assigned to, *Menephilus* in Australia. None of these are currently considered to be congeneric with the European type species *M. cylindricus* Herbst. However, *Zophophilus* (= *Teremenes* Carter), with four Australian species, is very close to *Menephilus* (Doyen *et al.* in press).

Carter's (1926) checklist of the Australian Tenebrionidae still contained elements of three different genera in '*Menephilus*' and it is our purpose in the present paper to sort out the species included and assign them to their correct genus. Two of the latter are new and are dealt with below. The third is *Tetragonomenes* Chevrolat (1878), subsequently redescribed as *Obriomaia* Gebien (1927) [see Kaszab (1983) for synonymy].

It is not our intention to revise the species of *Tetragonomenes* here and we have not examined the relevant types. It is clear from descriptions and identified material, however, that the following Australian specific names belong in this genus: *aeneus* Carter (1903), comb. nov., *azuripennis* Carter (1914), comb. nov., *intercoxalis* Kulzer (1951), *ocularis* Kulzer (1951), and *ruficornis* Champion (1894), comb. nov. It is unlikely that all of these names are valid.

Tetragonomenes is an Indo-Malayan genus of Coelometopinae and like all Australian members of this subfamily it represents the 'younger northern element' of the Australian fauna [*sensu* Mackerras (1970)]. Even so, it has penetrated the continent along the east coast as far south as Tasmania and along the south coast to Western Australia.

The other two elements in '*Menephilus*' include one other coelometopine, here named *Kaszaba* gen. nov., which has likewise reached Tasmania but which is not known west of central Victoria. It occurs in northern Australia but as yet we have not seen any Papuan or Indo-Malayan species which can be assigned to it. The third element is unrelated to the previous two and belongs to the Tenebrioninae, Tenebrionini. In Australia the native Tenebrionini are a Bassian group concentrated in the south-east but extending, with diminishing representation, as far north as New Guinea. We have named the tenebrionine genus *Bassianus* gen. nov. to highlight its southern origins.

That such disparate elements could hitherto have been confused under a single generic name reflects external morphological convergence, probably due to a similarity of habitat. From scant label data and our own observations, it appears that *Tetragonomenes*, *Kaszaba*, and *Bassianus* are all found under the bark of fallen trees and rotten logs in forests. In some cases members of different genera share exactly the same label data, indicating that they were found together.

We studied the original type material of all the 11 specific names in *Kaszaba* and *Bassianus* and

material from most major Australian collections. The following acronyms are used to identify the collections consulted:

- AMSA Australian Museum, Sydney
 ANIC Australian National Insect Collection, Canberra
 BMNH British Museum (Natural History), London
 EMUC Essig Museum, University of California, Berkeley
 HCOE Hope Entomological Collections, University Museum, Oxford
 MNHB Museum für Naturkunde der Humboldt-Universität, Berlin
 MVMA Museum of Victoria, Melbourne
 QMBA Queensland Museum, Brisbane
 SAMA South Australian Museum, Adelaide
 UQBA Department of Entomology, University of Queensland, Brisbane
 ZSSM Zoologische Staatssammlung, Munich.

SYSTEMATICS

Kaszaba gen. nov.

Type-species: *Tenebrio corvinus* Erichson, (1842).

Description of adult

General appearance: Oblong. Piceous, usually with metallic reflections. Total length 7–15 mm.

Head: Epistoma with anterior edge straight or feebly concave, its suture complete, indistinct, not impressed, arcuate. Eyes small to moderate, globose, separated by a distance equal to 2.5–5 eye widths. Canthus feebly developed. Head surface finely, densely punctate, glabrous. Bridge of tentorium arcuate. Labrum transverse. Mandibles bidentate apically. Lacinia with uncus. Maxillary palpi with terminal segment subtriangular or truncate-oval. Mentum trapezoidal, with a very prominent, rounded median longitudinal ridge. Antennae short, not reaching base of prothorax, segments gradually enlarging apically, with scattered tenebrioid organs (complex sensoria) on apical segments.

Prothorax: Subquadrate in outline, lateral edges feebly sinuate. Anterior angles broadly rounded, not prominent. Posterior angles subquadrate. Base feebly produced medially. Pronotum margined except along middle of anterior edge; disc convex, more so anteriorly, finely punctate, glabrous. Prosternum without median keel, process only feebly expanded and rounded apically, not prolonged. Coxal cavities closed both externally and internally.

Pterothorax: Humeri wider than base of prothorax. Elytra with nine deep striae and scutellary striole; stria punctures deep, crenulating

edges of intervals, which are convex, smooth, extremely finely punctate and glabrous. Epipleura narrow, terminating opposite penultimate sternite where they bear a deep groove to receive edges of later. Mesosternum shallowly excavated, finely and densely setose. Mesepimera reaching mid-coxal cavities. Wings without subcubital fleck, with normal tenebrioid venation (see Matthews 1986).

Legs: Front femora of average proportions. Tibiae gradually expanded apically, not dentate, apical spurs very short. Tarsal segments, except apical, short, penultimate cupuliform, with long dense setae beneath, including claw segment. Claws unmodified.

Abdomen: Intercostal process of basal sternite triangular. Upper edge of apical sternite grooved to receive elytra. Defensive reservoirs very large and reinforced by helical thickenings. Female genital tract of advanced coelometopine type (Tschinkel & Doyen 1980), without bursa and with globose spermatheca at apex of long spermathecal tube (Fig. 3). Ovipositor very long, of coelometopine type with transverse paraprocts (Fig. 3). Aedeagus with parameres slender and tapering, largely fused, comprising $\frac{2}{3}$ of total aedeagal length, enveloping median lobe, without setae.

Sexual dimorphism: Evident only on front femur, which in the male bears a small, linear lenticular tomentose patch in the middle of inside face.

Remarks

Kaszaba clearly belongs to the Coelometopinae, especially in the structure of the female genital tube (Fig. 3), which is of the typical advanced coelometopine type (Tschinkel & Doyen 1980), in the enlarged, annulate defensive reservoirs, and the transverse paraprocts of the ovipositor. Externally coelometopines are difficult to distinguish from certain Tenebrioninae, especially the Tenebrionini. About the only consistent character is the presence of complex antennal sensoria in the former and not in the latter.

Within the Coelometopinae, *Kaszaba* is recognised by a combination of the incomplete elytral epipleura, the feeble pro-mesosternal locking mechanism, rounded anterior pronotal angles, cupuliform penultimate tarsal segments, and fully developed hind wings with normal tenebrioid venation (not the 'coelometopine venation', see Matthews 1986). It comes closest to *Espiles* Pascoe in diagnostic characters but has an elongate, *Tenebrio*-like form and uniform coloration. Superficially *Kaszaba* most closely resembles *Tetragonomenes*, but the latter does not have cupuliform tarsal segments, the lateral pronotal margin is irregularly dentate, the pronotal disc is more convex and coarsely punctate, the median keel of the mentum is sharp (not rounded) and less

prominent, and in the male there is no setal patch on the inner front femoral surface.

The species of *Kaszaba* are closely related and can be separated with difficulty only on the basis of superficial features of colour, proportions and size. No genital differences could be found.

The genus is named in honour of the late Dr Zoltán Kaszab in recognition of his important contribution to knowledge of Pacific Tenebrionidae.

KEY TO THE SPECIES OF *KASZABA*

1. — Without or with only the faintest trace of metallic reflections; pronotum subquadrate, little broader anteriorly; eyes small, separated by about four times their width when seen from above (Fig. 28); total length 7–11 mm. Victoria to Queensland *coerulescens* (Haag-Rutenberg)
- With distinct blue, green or purple reflections; other characters not present in same combination 2
- 2(1) — Pronotum subquadrate, length to width ratio about 1 : 1.2, little broader anteriorly; eyes small, separated by about five times their width (Fig. 29); total length 10–15 mm. Tasmania to southern Queensland *corvina* (Erichson)
- Pronotum transverse, about 1.4 times as wide as long; eyes larger; total length not over 13 mm 3
- 3(2) — Total length 10–13 mm; pronotum slightly narrowing anteriorly; eyes separated by about four times their width (Fig. 30). Cairns district, Queensland *laeta* (Carter)
- Total length 8–10 mm; pronotum slightly widened anteriorly; eyes larger, separated by 2.5–3 times their width (Figs 31, 32). Northern Queensland and Northern Territory *pulchra* (Carter)

Kaszaba coerulescens (Haag-Rutenberg) comb. nov.
(Figs. 1, 3, 5, 28)

Menephilus coerulescens Haag-Rutenberg 1878: 100; Haag-Rutenberg 1879: 122; Carter 1914: 52, 53; Carter 1926: 146.

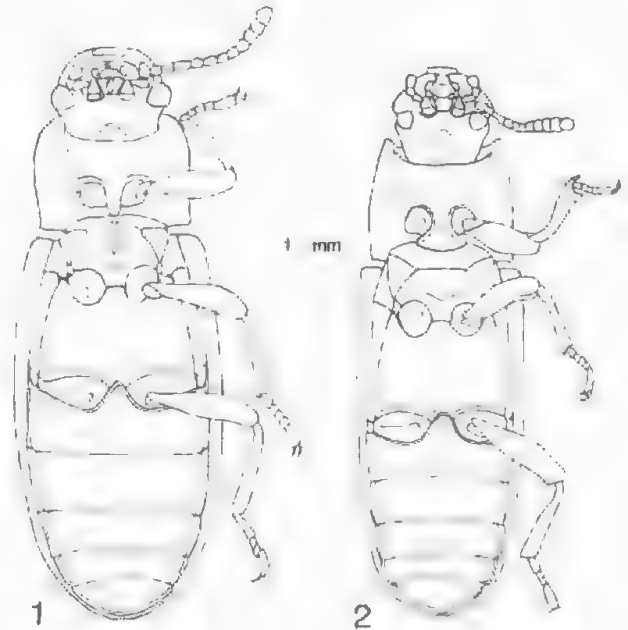
Types

The provenance of the species is given by Haag-Rutenberg (1878) as Cape York and New South Wales. The type series in ZSSM consists of six specimens, all the same species. The specimen bearing Haag's identification label '*coerulescens m.*', a female, is designated lectotype. It also bears the labels: 'cotype *Meneph. coerulescens* H.R.' and 'N. Holl. Dollé'. The other five specimens are

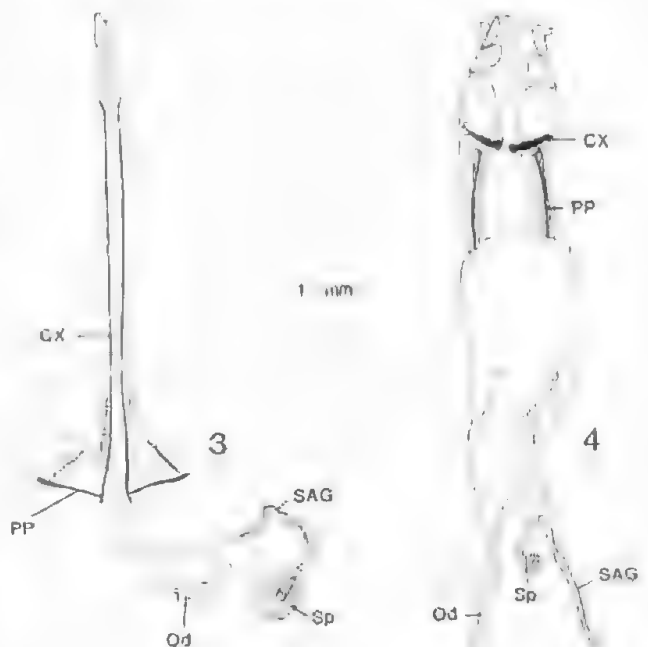
designated paralectotypes and are labelled as follows: 'Austr. bor. Godefr.' (1 ♂); 'N.S. Wales Bauling' (2 ♂ ♂); 'N. Holl. Parz.' (1 ♀); 'Cp. York Telfing' (1 ♀).

Distribution

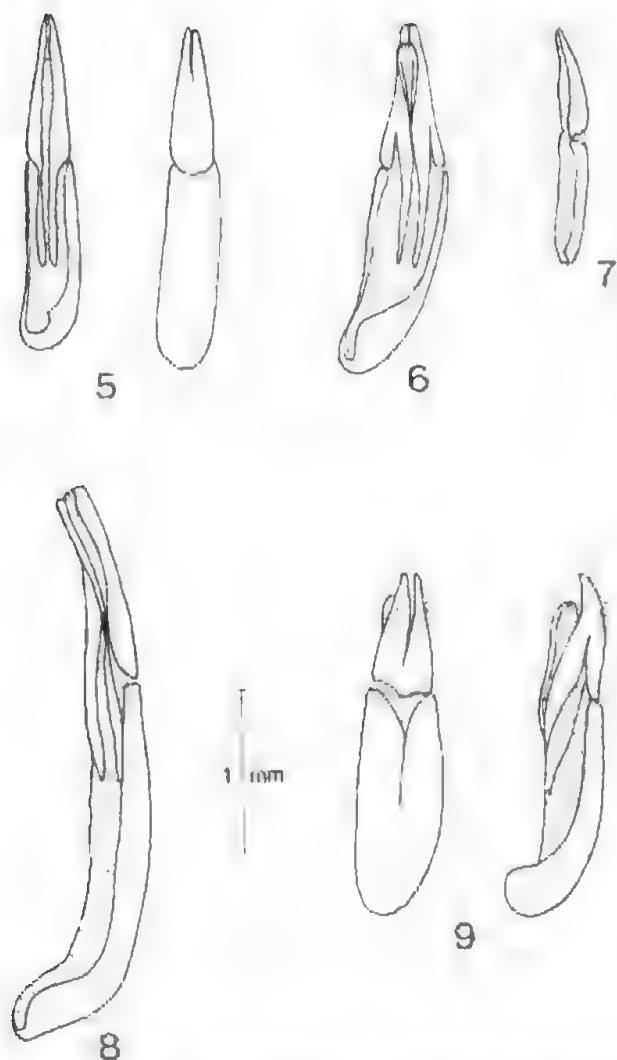
Coastal Victoria from the Melbourne area eastward, New South Wales mostly east of the Great



FIGURES 1 & 2. 1. *Kaszaba coerulescens*, venter. 2. *Bassianus colydioides*, venter.



FIGURES 3 & 4. Female genital apparatus. 3. *Kaszaba coerulescens*. 4. *Bassianus sydneyanus*. CX — baculus of coxite; PP — Baculus of paraproct; Od — oviduct; SAG — spermathecal accessory gland; Sp — spermatheca.



FIGURES 5-9. 5, aedeagus of *Kaszaba coerulescens*, ventral (left) and dorsal (right). Aedeagi of *Bassianus*: 6, *B. sydneyanus*. 7, *B. colydioides*. 8, *B. humilis*. 9, *B. rectibasis*, dorsal (left) and lateral view (right).

Dividing Range, south-eastern Queensland, and possibly isolated populations known from central Queensland at Eungella, west of Mackay, and the Atherton Tableland. The single specimen in the type series labelled Cape York is the only one known from that area.

Remarks

This is by far the most frequently collected species in the genus and has always gone correctly under the name *coerulescens* in collections despite that it is not bluish as Haag implied in the name and stressed in the description and remarks. It shows only a very faint trace of blue colour when wetted. In all other respects the type specimens agree with the original description.

Material examined

Two hundred and eighteen specimens. Victoria: Bacehus Marsh district; Beaconsfield; five miles N

Cann R., swamp forest; Chiltern; Gippsland; Healesville; Lakes Entrance; Melbourne; Mitchell Gorge; Narracan; Noble Park; Ringwood; Traralgon; Tyers; Victorian Alps; Warburton. Australian Capital Territory: Brindabella Range, Old Mill Rd, 2 775'. New South Wales: Bathurst; Black Heath; Blue Mts; Brown Mt; Bundjalong N.P., Black Rocks; Deep Creek; Dorriggo; Duggan's Gully, Upper Chichester; Eccleston; Forest Reefs; Galston; Gibraltar Range N.P.; Gosford; Hastings River; Jenolan S.F.; Lilyvale; McArthur's Clearing nr. Kempsey; 4-8 km SW Lake Cathie; Lowden Forest Park; Mittagong; 15 km NW Moruya; Mt Kaputar N.P., Dawsons Spr., 3 500-4 500'; Moss Vale; National Park; Penrose S.F.; Poverty Point 20 km SE Tenterfield; Richmond River; Seven Mile Beach; Sydney; Tweed River; Ulong; East Dorriggo; Upper William River; Uralla, 1 mile W of river crossing; Walcha; Wentworth Falls; Yetholm. Queensland: Acacia Ridge; Bald Mt area via Emu Vale, 3-4 000'; Blackall Range; Broken River, Eungella; Bunya Mts.; Cunningham's Gap N.P., 4 miles W Cunningham's Gap; Dunwich, N. Stradbroke I.; Eukey; Gatton; Kroombit Tops, 45 km SSW Calliope; 12 km N Kuranda; MacPherson's Range; Mapleton; Mt Tamborine; 18 mi N Quinalow; Stanthorpe; Sugarloaf. Logs, open forest, rainforest, dry sclerophyll. All months of the year. AMSA, ANIC, EMUC, MVMA, QMBA, SAMA, UQBA.

Kaszaba corvina (Erichson), comb. nov. (Fig. 29)

Tenebrio corvinus Erichson, 1842: 175.

Menephilus corvinus, Champion 1894: 390; Carter 1914: 52; Carter 1926: 146.

Tenebrio cyanipennis Hope 1843: 360; Hope 1845: 111; Champion 1894: 390 (syn).

Types

Of *corvina*: Van Diemen's Land. A single female in MNHB bears the labels '*corvinus* Er.' and 'Terr. van Diem. Schayer', and the number 45958. It is here designated lectotype. Of *cyanipennis*: a single male, somewhat damaged, bearing the labels 'TYPE HOPE Proc. Ent. Soc. 1842 p. 79 Coll. Hope Oxon' and '*cyanipennis* Hope N. Holl, Type Coll. 1102' (HCOE). The citation and date appearing on the first label is the one that is frequently quoted in catalogues but it is incorrect, since those Proceedings of the Entomological Society were not published until 1843.

Distribution

Tasmania, mountainous areas of Victoria, New South Wales, and extreme southern Queensland. The species was recorded from South Australia by

Champion (1894) and Carter (1914, 1926), apparently on the basis of the title of Hope's 1845 paper redescribing *cyanipennis*. However, in the latter work Hope described many species which were clearly not from Adelaide and there is no indication of where *cyanipennis* was collected. We have not seen this species from west of Macedon, Victoria.

Material examined

Twenty-four specimens. Tasmania: Brown's River; Hobart; Launceston; Mole Creek; Swansea. Victoria: Alps; Buffalo River Preserve; Macedon; Melbourne District. Australian Capital Territory: Brindabella Rge., Piccadilly Circus, 3 650'. New South Wales: Blue Mountains; Brown Mountain; Ebor; 30 km S Glen Innes; Tooloom Plateau via Urbenville. Queensland: Stanthorpe, Jan., Feb., Apr. Oct., Nov. AMSA, EMUC, MVMA, QMBA, SAMA, UQBA.

Kaszaba laeta (Carter) comb. nov. (Fig. 30)

Menephilus laetus Carter 1914: 69; Carter 1926: 146.

Types

Kuranda, North Queensland, MVMA. There are two specimens in the type series, a male and a female of the same species, both labelled 'Kuranda Dodd', and bearing the numbers T-4092 and T-4091 respectively on separate red labels. The female also bears the label in Carter's hand '*Menephilus laetus* Carter 10-11-12'. The female, No. 4091 (identified as a male) is in better condition and is hereby designated lectotype, and the male, allotype.

Distribution

Known only from the Atherton Tableland in north Queensland.

Material examined

Eight specimens. Queensland: Cairns District; Mareeba; Ravenshoe. July (3). MVMA, QMBA, SAMA.

Kaszaba pulchra (Carter), comb. nov. (Figs 31, 32)

Menephilus pulcher Carter 1924: 36; Carter 1926: 146.

Type

North Queensland; Deeral. J.F. Illingworth, scrub. AMSA K67235. A single female with the abdomen missing, designated holotype by Carter (1924). Deeral (17°13'S, 145°55'E) is a station on the railway which parallels Highway One, approx-

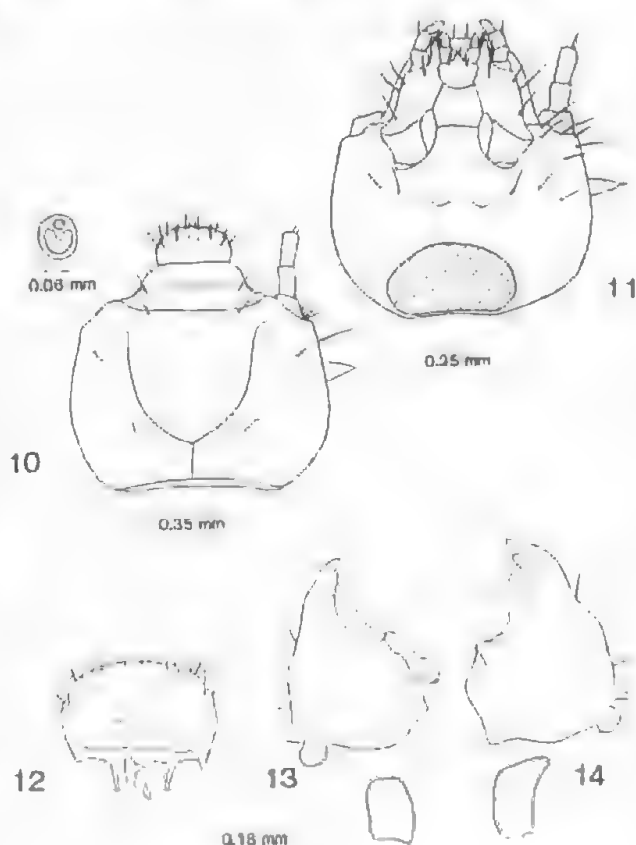
imately halfway between Gordonvale and Babinda.

Distribution

Along the coast and on offshore islands, from Bowen (Port Denison) to Cairns, north Queensland and the northern end of the Northern Territory.

Remarks

Queensland specimens have the elytra green with the lateral three or four intervals golden, whereas the three Northern Territory specimens known have uniformly purple elytra. The latter also have slightly smaller eyes in dorsal view (Fig. 32). Material is insufficient for us to decide whether the Northern Territory form is a separate species.



FIGURES 10-14. *Bassianus rectibasis*, larva. 10, head, dorsal aspect, mandibles and left antenna removed. Dashed line indicates eye spots. Inset shows apical view of 2nd antennal segment. 11, same, ventral aspect. 12, labrum (epipharynx), ventral aspect. 13, 14, right and left mandibles, ventral aspect, with normal view of molar surfaces below.

Material examined

Thirteen specimens. Queensland: Bowen; Cairns; Magnetic Island; Mary Creek; Palm Island; Port Denison. Northern Territory: Groote Eylandt; South Alligator Inn, May (1). AMSA, EMUC, SAMA, UQBA.

Bassianus gen. nov.

Type-species: *Tenebrio colydioides* Erichson, 1842.

Description of adult

General appearance: Oblong. Entirely piceous. Total length 6–13 mm.

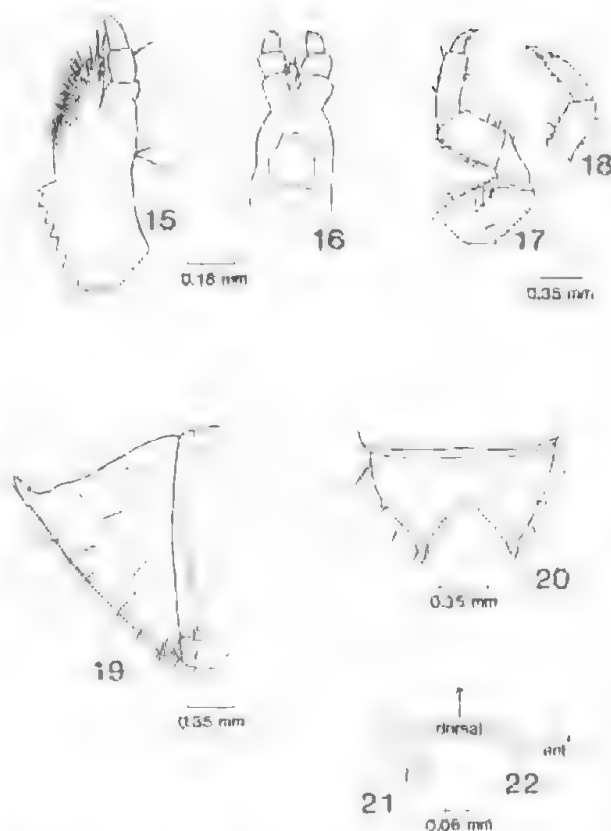
Head: Epistoma with anterior edge shallowly concave, suture ill-defined, arcuate. Eyes small, inwardly with a straight edge, separated by distance equal to 3.5–5 eye widths, canthus well developed. Head surface densely punctate, glabrous. Bridge of tentorium flat, straight. Labrum transverse. Mandibles bidentate apically. Lacinia with uncus. Maxillary palpi with terminal segment oval or subtriangular. Mentum trapezoidal, without median keel or with feeble one. Antennae short, not reaching base of prothorax, apical four or five segments somewhat widened, without complex sensoria.

Prothorax: Subquadrate to trapezoidal in outline. Anterior angles strongly projecting forward. Posterior angles subquadrate or subacute. Base sinuate or straight. Pronotum finely margined except along middle of anterior edge, disc evenly convex, finely to moderate punctate, glabrous. Prosternum without median keel, process strongly expanded apically, not prolonged. Coxal cavities closed externally, open internally.

Pterothorax: Humeri little wider than base of prothorax, more or less grooved basally to receive prothorax. Elytra with 9 shallow, coarsely punctate striae and scutellary striae. Intervals feebly convex, impunctate and glabrous. Epipleura narrow, complete to apices. Mesosternum strongly stepped to receive prosternum. Mesepimera reaching mid-coxal cavities. Metendosternite Y-shaped, without laminae. Wings with subcubital flock, sometimes faint.

Legs: Front femora relatively massive. Tibiae gradually expanded and with dense setae apically, not dentate, apical spurs very short. Tarsal segments, except apical, short, not cupuliform, with long dense setae beneath all except claw segment, which has only sparse setae, claws unmodified.

Abdomen: Intercoxal process of basal sternite U-shaped or rounded-triangular, upper edge of apical sternite not grooved. Defensive reservoirs small, without annuli. Female genital tract of tenebrionine type (Tschinkel & Doyen 1980), without bursa, with strongly coiled spermatheca at end of short branch diverging from non-glandular basal portion of the accessory gland (Fig. 4). Ovipositor short, of tenebrionine type with longitudinal paraprocts (Fig. 4). Aedeagus with parameres basally fused, slender and tapering, setose, comprising nearly half of total aedeagal length, enveloping median lobe. Median lobe with two reinforcing rods (Figs 6–9).



FIGURES 15–22. *Bassianus rectibasis*, larva. 15, left maxilla, ventral aspect. 16, hypopharynx, dorsal. 17, 18, prothoracic and mesothoracic legs, posterior aspect. 19, abdominal apex, lateral. 20, abdominal apex, dorsal. 21, 22, right mesothoracic and second abdominal spiracles. Crenulate margin is posterior.

Sexual dimorphism: Evident in shape of hind leg of male, with femur posteriorly concave in outline and bearing a small tooth or angle distally, trochanter usually dentate, and tibia sometimes apically bent. Male *R. sydneyanus* also have a short tomentose line on inner edges of all femora, and fore tibia apically bent.

Description of late instar larva (based on rectibasis).

General appearance: Body subcylindrical, moderately sclerotized. Brownish. Total length 12–14 mm.

Head: Slightly flattened, deflexed at rest, with mouthparts directed anteroventrally. Cranium medium brown, coarsely punctate. Epicranial stem length about 0.15 times head width; frontal arms very briefly bifurcate at apex, not reaching frontoclypeal suture (Fig. 10), endocarina absent. Lateral ocelli consisting of three pigment spots arranged in vertical row just behind antennal articulation and single spot (or two poorly separated spots) posterodorsal to row of three; cuticle colorless above eyespots, but not modified as lens. Cranial setae consisting of one pair at corners of clypeus, one pair just behind clypeofrontal suture.

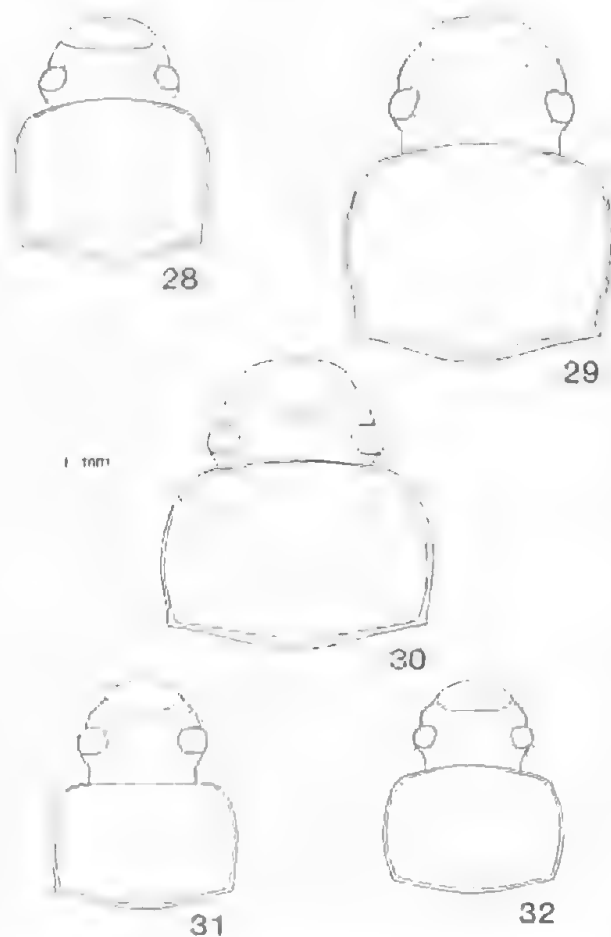


FIGURES 23-27. *Bassianus sydneyanus*, pupa. 23, dorsal aspect of pupa. 24, lateral aspect of pupa. 25, 26, right lateral lamellae (gln traps) of abdominal segment I and II. 27, abdominal apex, ventral.

two dorsal pairs, lateroventral patches of about 7-8 setae on each side and line of about five setae between eye spots and antennal base (Figs 10, 11). Clypeus with posterior half rigidly sclerotized, pigmented; anterior half flexible, densely set with asperities. Gular sutures incomplete posteriorly; tentorial pits aligned horizontally (Fig. 11). Antenna three-segmented; articular membrane expansive, allowing partial antennal retraction, and set with minute asperities; antennal segment two slightly longer than first; sensorium broadly U-shaped, partially encircling base of peg-like third segment. Labrum about 1.5 times broader than long, bearing transverse row of about six setae across middle and apical fringe of about 10 setae (Fig. 10); tormal arms slender, almost straight; epipharynx with marginal row of eight bristles, two marginal peg-like setae, one pair of submarginal and four pairs of central, annular sensilla; single masticatory process on right, several smaller processes on left. Mandibles (Figs 13, 14) with apices bifid; retinaculum a low carina on right mandible; bidentate, prominent process on left, separated from incisor lobe by deep cleft; molar lobes prominently elevated, right concave, left with prominent anteroventral tooth and strong dorsal

ridge; ectal mandibular surfaces each with two setae. Maxilla (Figs 11, 15) with articulatory area elongate, clearly demarked from cardo; mala with double row of spines on medial surface, scattered finer, shorter setae on ectal surface. Labium with prementum trapezoidal, slightly broader than long, bearing seta at base of each palp, six setae dorsally and apically on ligula (Figs 11, 16); mentum irregularly hexagonal, about as long as wide; submentum not distinct from gula; hypopharyngeal sclerome with four-lobed anterior margin, dorsal surface very weakly concave.

Thorax: With pronotum about twice as long as mesonotum, anterior sixth of prothorax slightly constricted, longitudinally striolate dorsally, becoming finely granulose ventrally and continuous with sternite; posterior eighth of tergite forming finely granulose border; central portion of tergite coarsely, sparsely and shallowly punctate; laterotergite separated from tergite by carina, from sternal region by infolding, but continuous with anterior marginal region, finely granulose; sternite finely granulose, strongly involuted in anterior third,



FIGURES 28-32. Dorsal outlines of head and pronotum of *Kaszaba*. 28, *K. coerulescens*. 29, *K. corvina*. 30, *K. laeta*. 31, *K. pulchra*, Queensland form. 32, *K. pulchra*, Northern Territory form.

forming subvertical surface against which deflexed head rests. Tergite with row of about eight long, slender setae along lateral margin, few short setae on disc; laterotergite with about five setae in longitudinal row; sternite with pair of anterolateral setae and one pair centrally. Mesothorax and metathorax similar to prothorax, but tergite without anterior striolate border. Prothoracic leg slightly larger, legs otherwise similar (Figs 17, 18), coxa with row of setae along anterior and posterior borders of ectal surface; femur and tibia with few short setae on ectal surface; trochanter with two, femur with three and tibia with four short setae on ental surface, apical two on tibia stouter; claw with pair of ental setae.

Abdomen: Segments 1-7 similar to metathoracic, but tergites with one anterior and one posterior short seta on lateral margins; laterotergites with one short seta at anterior fifth, sternites with single anterior and two posterior setae near each lateral margin, except sternite one, which has band of about 20 setae along anterior margin. Segment 8 similar, but with 2 posterolateral setae and one seta more dorsally near posterior margin (Fig. 19). Tergite 9 very much larger than narrowly transverse sternite (Fig. 19); deeply bifid posteriorly and produced as slightly upcurved prongs, and bearing pairs of nonarticulated spur-like processes on each side (Figs 19, 20); short setae situated near each process and around apices of prongs; long, slender setae distributed ventrolaterally and laterally on tergite and across sternite. Pygopods not visible.

Spiracles: (Figs 21, 22) with posterior margins crenulate; mesothoracic elliptical with about eight distinct, deep crenulations; abdominals very broadly elliptical with three or four distinct crenulations.

Description of pupa (based on sydneyanus)

General appearance: uniformly pale brown. Without setae. Total length 9 mm.

Head: Bent posteroventrally, invisible from above (Figs 23, 24); antenna held below prothoracic and elytral margin, just above front legs; segments 5-10 distinguished by annuli of blunt, non-articulated tubercles, largest dorsally and on apical segments; segment 11 with tubercles over entire surface.

Pronotum: With few tubercles along lateral margins; hypomeron with tooth like process protruding between antenna and profemur. Elytra and hindwings held between meso- and metathoracic legs; elytra with nine striae.

Abdomen: Tergites 1-7 produced as large lateral lamellae; lamella on segment 1 (Fig. 25) with weak anterior and strong posterior tooth; those on segments 2-6 with strong anterior and posterior tooth; anterior margin minutely serrate; lateral and posterior margins finely, irregularly dentate. Lamella on segment 7 with anterior corner angulate,

then arcuately receding posteriorly, with two marginal teeth; segment 8 with margin moderately explanate but unarmed, Sternites 7 and 8 with few weak tubercles along posterior margins. Tergite 9 produced as attenuate posterior processes; sternite 9, as much shorter, blunter processes.

Remarks

The structure of the female genital apparatus (Fig. 4) places this genus unequivocally in the Tenebrionini. It is in many respects similar to *Tenebrio* Linnaeus but does not have the spinulose connecting membrane of the aedeagus which is the principal apomorphism of the latter. As in some *Tenebrio* it has internally open procoxal cavities, a plesiomorphous feature shared with Heleini and Cyphaleini, with which it also shares (in part) the plesiomorphous subcubital fleck on the wings, absent in *Tenebrio*. Most of the above characters are found in the other native Australian Tenebrionini: *Meneristes* Pascoe, *Sloanea* Carter, and *Asphalus* Pascoe. *Bassianus* may be distinguished from all of these by the combination of the absence of a longitudinal groove on the outer faces of the tibiae and smaller size, and from all but *Meneristes* by the presence of wings. Separation of Tenebrionini, Heleini and Cyphaleini is discussed in Doyen *et al.* (in press) and in papers in preparation by the authors.

From the superficially similar but unrelated coelometopline genera *Tetragonomenes* and *Kaszaba*, with which it has been confused, adult *Bassianus* may be distinguished most easily by the absence of complex antennal sensoria, advanced anterior pronotal angles, distally expanded posterior process, and complete elytral epipleura.

Watt (1974) distinguished larval Heleini and Cyphaleini from other tribes of Tenebrioninae on the basis of spiracular structure: peritreme crenulate in Heleini and Cyphaleini, simply annular in other tribes. He also remarked that larvae of *Meneristes* and *Asphalus*, though usually placed in Tenebrionini, which the adults resemble, have crenulate spiracles. Larvae of *Bassianus* have the spiracular peritreme crenulate, but only on the posterior side, and in the abdominal spiracles only three or four crenulations are visible.

An additional feature which may differentiate many larval Heleini and Tenebrionini is the structure of abdominal segment nine. In Tenebrionini (*Tenebrio*, *Neatus* Leconte, *Alphitobius* Stephens, *Zophobas* Blanchard) sternite 9 is about one quarter as long as the tergite, and large pygopods are usually extruded in preserved specimens. In Heleini, as noted by Allsopp (1979), the sternite is much smaller, usually about one eighth to one tenth as long as the tergite. In Heleini pygopods are very small and rarely visible

in preserved specimens. In these features Heleini more closely resemble Ulomini.

Larval Heleini we have examined have the gular sutures very faint in the posterior half and not reaching the occipital foramen. In *Tenebrio* and *Neatus* the sutures may be somewhat faint posteriorly, but extend to the foramen. In *Zophobas*, however, the sutures are reduced to the tentorial pits, as in *Bassianus*.

Other characteristics, such as the shape of the antennal sensorium, configuration of epipharyngeal sensory organs, or structure of tergite 9 (Doyen *et al.* in press), may prove to be of value for these larvae, but much more extensive comparisons are required.

The genus most similar to *Bassianus* in larval features is *Meneristes* (Watt 1974). They share the large urogomphi on tergite 9, as well as exceedingly similar mouthpart and leg structures. In *Bassianus*, in addition to the large urogomphi, there are five other pairs of non-articulated spurs on the dorsolateral to ventrolateral surfaces of the tergite. In *Meneristes* there are only two lateral pairs of spurs. In *Bassianus* the antennal sensorium is U-shaped, whereas in *Meneristes* it is three-lobed. The epipharynx of *Meneristes* bears a pair of stout, short spines behind the patch of annular sensoria; in *Bassianus* the spines are absent. Finally, in *Bassianus* the legs are slightly more slender, with a comb of three or four tibial setae; in *Meneristes* there are five or more tibial setae, at least in later instars.

The general pupal form and the shape of the gin traps of *Bassianus* are similar to those of *Meneristes*. However, in *Meneristes* the pupal antennae lack the annuli of tubercles present in *Bassianus*. Pupal antennae of Tenebrioninae are not known to be tuberculate. This feature has not yet been examined in enough Heleini or Cyphaleini to speculate on its uniqueness.

The species of *Bassianus* are distinct and readily separated on external morphological characters. Minor genitalic differences could be found in the relative shape of the aedeagus (Figs 6–9). In addition, *rectibasis* bears long setae on the parameres, which in the other species are only minutely setulose.

KEY TO THE SPECIES OF *BASSIANUS*

1. — Base of pronotum strongly sinuate, very shallow transverse basal depression often present on disc (Fig. 33), inflected portions wrinkled or smooth, shagreened, not pustulose; striae usually effaced near bases of elytra, margin of last abdominal sternite not grooved; with fore tibia abruptly curved and expanded apically and all femora with tomentose

line on inner faces. Total length 9–12 mm. Victoria, New South Wales, Queensland

.....*sydneyanus* (Blackburn)

- Base of pronotum straight or nearly so without transverse depression, inflected portions pustulose; elytral striae, except 7 and 8, complete to bases; margin of last abdominal sternite deeply grooved, ♂ with hind femur more or less distorted, femora without tomentose lines.....2

- 2(1) — Underside of prothorax glabrous, prothorax often quadrate in outline (Fig. 34); total length 6–10 mm. South Australia, Tasmania, Victoria, New South Wales and Queensland.....

.....*colydioides* (Erichson)

- Underside of prothorax, especially prosternal process, with long setae; prothorax narrowing anteriorly (Figs 35, 36).....3

- 3(2) — Prosternum pustulose, upper surfaces coarsely punctate and shagreened, matt; total length 12–13 mm. Tasmania

.....*humilis* (Erichson)

- Prosternum punctate only; upper surfaces finely punctate, nitid; total length 8–11 mm. Northern New South Wales, Queensland.....

.....*rectibasis* (Carter)

Bassianus sydneyanus (Blackburn), comb. nov.
(Figs 4, 6, 33)

Menephilus sydneyanus Blackburn 1893: 132;
Carter 1914: 53; Carter 1926: 146.

Type

Near Sydney, N.S.W. BMNH. A female on a card bearing the designation 'T 4515 Syd.', with labels saying '*Menephilus sydneyanus* Blackb.' and 'Blackburn Coll. 1910-236', is designated lectotype.

Distribution

Eastern Victoria, New South Wales east of the Great Dividing Range, south-eastern Queensland, with a few individuals collected as far north as Kuranda.

Material examined

One hundred and ninety-two specimens. Victoria: Beaconsfield; Brighton; Cann River; 5 km N Cann River; Hurstbridge; Macedon; Mt Dom Dom (?) 2,500'; Narracan; North Melbourne; 19 miles W of Tallangatta nr Koetong; Tyers River; Warragul. New South Wales: Acacia Creek; Barrington Tops *via* Salisbury; Bateman's Bay; Bellingen; Blue Mountains; Brooklana, Sydney; Carrai Plateau *via*

Kempsey; Chichester State Forest, Lagoon, Pinch Park; Comboyne, 9 km W of Coonabarabran, 533 m; Coopernook Creek nr Brooklana; 13 km W of Coramba; Dingo Tops, 57 km NW Wingham; Dorrigo; Forest Reefs; Gibraltar Range N.P.; Gloucester River (Barrington Tops); 30 km S Glen Innes; Illawarra; 4–8 km SW Lake Cathie; Lowden For. Park, 30 km NE Captain's Flat; Minamurra Falls via Kiana; Monga; Mt Kosciusko; Mt Royal Range, 17 km E Moonany Flat; Mt Wilson; Myall Lakes, Booloombayt.; 4 miles N of Nelligen; Poverty Point, 20 km SE of Tenterfield; Styx R., Wattle Flat Camp; Swan Lake; Tenterfield; Upper Hunter; Werrikembi N.P., Cobcroft Camp; Wollomombi Falls, Queensland; Bald Mt area via Emu Vale; Barron River Falls; Binna Burra N.P.; Boldery Park, Cooyar; Bulburin S.F.; Bunya Mountains; 26 km W Goomburra; Joalah N.P., Tamborine Mt; Kroombit Tops, 65 km SW of Gladstone, 1 000–1 100m; Kuranda; 12 km N Kuranda; Lamington N.P.; McPherson Range N.P.; Mt Spec; Mt Tamborine; National Park; 10 km NE of Queen Mary Falls; Springbrook; Stanthorpe; Undercliff. Under bark, rotten logs; fallen logs; open forest. All months of the year. AMSA, ANIC, EMUC, MYMA, QMBA, SAMA, UQBA

One pupa and several larval exuviae reared from larvae collected in Gibraltar Range N.P., New South Wales 27.XII.1982.

***Bassianus colydioides* (Erichson), comb. nov.**
(Figs 2, 7, 34)

Tenebrio colydioides Erichson 1842: 175.

Menephilus colydioides, Carter 1914: 52; Carter 1926: 146.

Menephilus parvulus Macleay 1872: 285; Carter 1914: 53; Carter 1926: 146 (syn).

Menephilus armstrongi Carter 1933: 171. New synonymy.

Types

Of *colydioides*: Van Diemen's Land. A series of four female cotypes in MNHB, of which the specimen bearing the handwritten label 'colydioides Er. Terr. V Diem. Schayer' and the number 45953 is hereby designated lectotype; the others labelled 'Hist. Coll. Nr. 45943 Terra van Diem. Schayer' are paralectotypes. Of *parvulus*: Two specimens in AMSA on an unmarked card, labelled *Menephilus parvulus* Mcl. W. Gayndah in Macleay's hand, and bearing the number K34632. Both were apparently considered to be holotypes by McKeown (1948). It is therefore necessary to select one as lectotype and the one on the left, a male, is hereby designated. The one on the right, a female is designated allolectotype. Three other specimens from Gayndah

in the Macleay collection in ANIC, evidently from the type series, are designated paralectotypes. Of *armstrongi*: Holotype ♀, Nandewar Range, New South Wales, 6.XI.32, J. Armstrong, ANIC.

Distribution

South Australia (the South East and Kangaroo Island), Tasmania, Victoria, New South Wales along and east of the Great Dividing Range, south-eastern Queensland as far as Bundaberg, and Heron Island.

Remarks

M. armstrongi was distinguished from *colydioides* by Carter on features of puncturation, proportion and colour, but the type is a normal female *colydioides*.

Material examined

One hundred and forty-two specimens. South Australia: Lucindale; Wilson R., Kangaroo Island, Tasmania: Devonport; George Town; Hobart; King Island; Lakes; Launceston; Lefroy; Long Bay; Mt Wellington; National Park; River Isis; St Patrick's River; Tyenna; Wilmot; Wynyard. Victoria: Brighton; Hastings; Lake Corangamite; Lorne; Macedon; Moe; Nelson; Warburton; Warnambool; Warragul; Werribee; Yarra Junction. New South Wales: Blue Mountains; Congo, 8 km SE by E of Moruya; Forest Reefs; 30 km S Glen Innes; Hanging Rock; Maitland; Mt Canobolis, 3 500–4 500'; Mt Wilson; Mullaly; Muswellbrook; Oberon; Sydney; 6 km NE of Tenterfield; Wahroonga; Worrigeen nr Nowra. Queensland: Brisbane; Bundaberg; Cunningham's Gap; Dunwich; Eukey; Heron Island; Indooroopilly; Mt Glorious; River Heads, 14 km SW of Urangan; Stanthorpe; Toowoomba; Yarraman S.F. Logs, dry sclerophyll. All months of the year. AMSA, ANIC, EMUC, MYMA, QMBA, SAMA, UQBA.

***Bassianus humilis* (Erichson) comb. nov.**
(Figs 8, 35)

Tenebrio humilis Erichson 1842: 174.

Menephilus humilis, Carter 1914: 53, Carter 1926: 146.

Type

Van Diemen's Land. Four female cotypes in MNHB, of which the specimen bearing the handwritten labels 'humilis Er.' and 'Terra van Diem. Schayer', and the number 45952, is hereby designated lectotype. The other three with recent labels 'Hist. Coll. Nr. 45952 Terra van Diem. Schayer' are paralectotypes.

Distribution

Tasmania.

Material examined

Three specimens. Tasmania: Brighton; Lakes; River Isis. Nov. SAMA.

Bassianus rectibasis (Carter) comb. nov.
(Figs 9, 36)

Menepphilus rectibasis Carter 1914: 53, 70; Carter 1926: 146.

Type

Dorrigo, Cox. Two males on a card in MVMA. The smaller left hand one has the letter 'T' written below it on the card and is here designated lectotype (T-4093). The other specimen (T-4094) is designated paralectotype.

Distribution

North-eastern New South Wales and south-eastern Queensland, with an apparently separate population in the area of the Atherton Tableland.

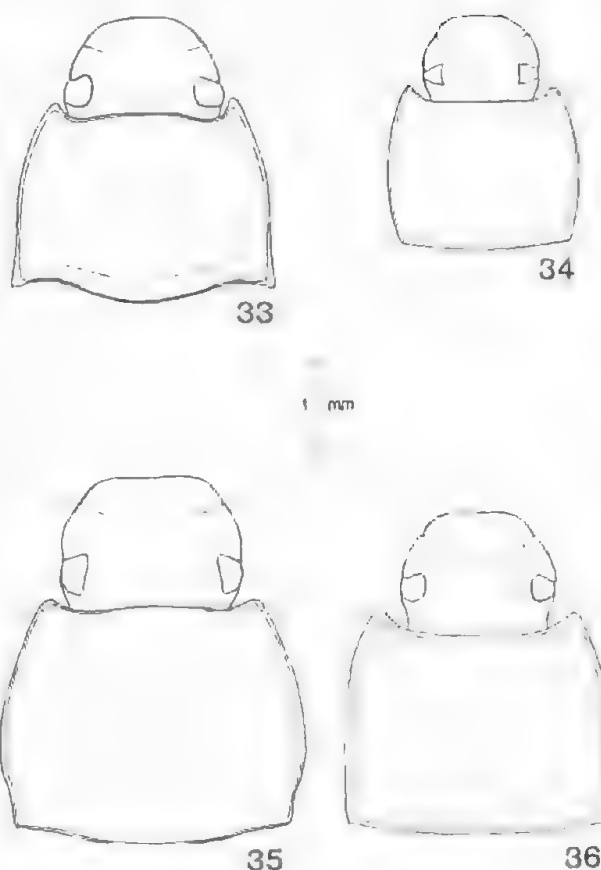
Material examined

Eighty specimens. New South Wales: Alstonville, Lumley Park; Barrington Tops, Allyn R. Forest; Cascade; Dorrigo; Dorrigo N.P.; Grafton; Lismore; New England N.P.; Richmond River; Tooloom Scrub via Woodenbong; Tooloom. Queensland: Brisbane; Bunya Mountains; Cairns District; Cooloola N.P. nr Poona Lake; Herberton; Joalah N.P., Tamborine; Lamington N.P., Malanda; Lever's Plateau via Rathdowney; Mt Glorious; Mt Tamborine; National Park; Ravenshoe. Rainforest. Apr.-Feb., mainly Sep.-Dec. AMSA, ANIC, EMUC, MVMA, QMBA, SAMA, UQBA.

Two mature larvae and several exuviae laboratory-reared from adults collected in New South Wales, Barrington Tops, Allyn River Forest, 9.XI.1982.

ACKNOWLEDGMENTS

We thank the following curators of the collections consulted for the loan of material: Dr F. Hieke (MNH),



FIGURES 33-36. Dorsal outlines of head and pronotum of *Bassianus*. 33, *B. sydneyanus*. 34, *B. colydioides*. 35, *B. humilis*. 36, *B. rectibasis*.

Mr G. Holloway (AMSA), Mr L. Jessop (BMNH), Dr I. Lansbury (HCOE) Dr J. Lawrence (ANIC), Dr D. McAlpine (AMSA), Dr G. Monteith (QMBA), Dr A. Neboiss (MVMA), Dr G. Scherer (ZSSM), and Ms M. Schneider (UQBA). We are grateful to Dr I. Lansbury for help with literature references of Hope and Erichson, and to Dr O. Merkl of the Hungarian Natural History Museum for information on Z. Kaszab patronyms.

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PREPARING GRASS WITCHETTY GRUBS

L. A. HERCUS

Summary

This paper presents information on cultural practices relating to food preservation and preparation of grass witchetty grubs among the Wangkangurru people of the Lake Eyre Basin of south-eastern Australia.

PREPARING GRASS WITCHETTY GRUBS

L.A. HERCUS

HERCUS, L. A. 1989. Preparing grass witchetty grubs. *Rec. S. Aust. Mus.* 23(1): 51-57.

This paper presents information on cultural practices relating to food preservation and preparation of grass witchetty grubs among the Wangkangurru people of the Lake Eyre Basin of south-eastern central Australia.

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It has long been known that Aboriginal people, particularly in the Lake Eyre Basin, stored dry food. The foods most commonly dried were those which were highly seasonal. There was sometimes a surplus of fish when lakes and waterholes were drying out. Reuther has mentioned how the Diyari people of the lower Cooper processed this fish, drying it and reducing it to powder: there are several references to this in his vocabulary (e.g. Reuther 1981, IV: 3051, 3712). This procedure was also used among Arabana people on the western side of Lake Eyre: it even plays a part in myth. The Arabana Fish History relates how there were women at a birth-camp near Sunny Creek on Anna Creek Station. As was the custom, men threw over food for them to eat, and as fish was plentiful, they were given the most common type, bony bream, more and more of it. They could not eat it all and so they put it out in flat layers to dry. It turned into the slabs of rock at the famous *Palthirri Pithi*, the Anna Creek grinding stone quarry.

Some grubs were similarly dried and powdered. Reuther gives an account of how the Diyari Ancestor 'Darana' (Reuther 1981, X: 10) by means of magic incantations collected grass witchetty grubs, called *muluru* in Diyari, and then dried and powdered them. The whole matter of food storage has recently been studied by Kimber (1984: 18), and the present paper gives further background to his comments on dried grubs.

The term 'witchetty grub' refers to the larvae of a number of different species of insects. N.B. Tindale has worked extensively on these (1953, 1958). The distinctions made between grubs in Aboriginal languages usually refer to the habitat (Johnston 1943). Thus in the Wangkangurru language of the Simpson Desert the green caterpillars that appear in large numbers after rain and feed on the fresh grass are called *wadnhamarra* (Lower Southern Aranda *anhemare*). Root grubs (larvae of buprestid beetles and cossid moths) are called *pardi*, and this word is also used as a general term for all caterpillars. The grubs from box-trees have the special name *pitha-kapurru* (larvae of hepealid moths, Cleland 1966: 144). The very large



FIGURE 1. Dora Parker with her youngest child, Fabian.

green caterpillars that live in foliage are called *yatinjangu*. In the mythology too these different types of grubs all have their separate stories. There is a major myth and song cycle about a big 'Grub-war'. Different groups of ancestral grub men coming from the south, converge and have a battle on the grassy plains near New Crown in the extreme south of the Northern Territory.

Everyone was happy to eat the grubs from roots and trees, but it seems that the grass grubs were dried and stored. This was not only a matter of food storage: these grubs were not considered edible except in powder form. The preparation of the grubs was an elaborate process which was still carried out by Wangkangurru and Yarluyandi people living according to a semi-traditional life-style in the 1930s at Pandie Pandie and at Andrewilla south of Birdsville.

Dora Parker *Alinda* (Fig. 1) could recall the Pandie days and Mick McLean *Irinjili*, her (classificatory) uncle (Fig. 2), had recollections of much earlier days in the Simpson Desert (Hercus 1986). Speaking in a mixture of Wangkangurru and English they discussed the preparation of grass witchetty grubs. Their conversation was recorded at Port Augusta in January 1967.¹

9. D. They have their fire all ready. One,

<i>nhanhanga</i> There	<i>nguru-ru</i> other-ERG	<i>uka-nha</i> he-ACC	<i>maka</i> fire	<i>thupu</i> smoke	<i>mapa-rna,</i> collect-IMP
<i>partjarna</i> all	<i>thupungka-la-yira.</i> smoke-ALT-PUNC.				

10. One make a fire and they all make it same time. All level.

11. D. *kanhangarda* *kudna* *thanti-lhiku.*
There guts get out-HIST

They tear it open and pick the grass out of them,

<i>kudna</i> guts	<i>thanti-lhiku..</i> get out-HIST.
----------------------	--

12. L. There is grass inside?

13. M. That green stuff.

14. D. From when they eat grass.

<i>katharra-ma-rna,</i> Torn open-make-IMP	<i>kudna</i> guts	<i>thanti-lhiku.</i> get out-HIST.
--	----------------------	---------------------------------------

15. M. Take the head off, chuck'm all hot then.

16. D. *thawi-lhiku* *kari-nha* *katharra-ma-rna..*
Throw-HIST they-ACC torn up-make IMP

17. M. *thati-ma-lhuku,* *thingki-la-lhuku,*
dry-make-HIST, dry off-ALT-HIST,
(in smoke) like from a motor-car (exhaust), but you are not allowed to see that,

18. Boys not allowed.

19. D. Girls not allowed to be there.

<i>yaka-yaka-rna</i> Chase away-IMP	<i>kari-ri.</i> they-ERG.
--	------------------------------

20. M. *kari-ri* *wadnhi-ngura* *pardi* *one day.*
They-ERG cook-CONT grub

21. Might be a couple of days time, when he get dry,

<i>kari -ri</i> they-ERG	<i>ngampa-lhuku</i> pound-HIST	<i>pirda-ru</i> beat-NAR.
-----------------------------	-----------------------------------	------------------------------

22. L. What about *paya-paya?*
little birds?

23. M. They got plenty to eat, they wouldn't come up..

24. *ngampa-ru* *thaka-lhuku* *pirda-lhuku,*
nardoo stone-ERG strike-HIST beat-HIST
pulhpa-ma-rna *thaka-lhuku.*
powder-make-IMP, strike-HIST.

25. Some fellow fill'm up in a bag.

<i>yakuta-nga</i>	<i>thangka-ngura.</i>	<i>pirda-yi-ngura.</i>
Bag-LOC	stay-CONT,	Beat-ACT-CONT.

26. You are not allowed to see that too. Ha, Ha! They were very particular.

27. D. And when they eat that, they get that *paRu* then, *arkapa*, they paint their mouth² with that.

- | | | | | |
|-----|--------------|------------------|-----------------|---------------------|
| 28. | <i>paRu,</i> | <i>arkapa-ra</i> | <i>untharna</i> | <i>marna-ki-thi</i> |
| | yellow ochre | red ochre-CAUS, | pipeclay | mouth-EMPH |
- pithi-rna-ya -lhuku.*
paint-SP-TR-HIST.

arkapa was the red one.

29. M. *untharna* we call'm. *untharna* and *miRaka*. There is no *warru* in it, only *yikurla*. We get'm off west, from Musgrave Ranges, Antikirinja people. We got a place too where you get'm *URara*, out from Granite Downs.³

30. L. When they put that *paRu* on, then they can eat it?

31. D. After. (Or else they would get) a sore throat . . .

32. M. They reckon it is good after it dries out, just the same as with fruit, you dry'm out and put'm through the machine, same way.

- | | | | |
|-----|----------------------|--------------------|----------------------|
| 33. | <i>pulhpa-ma-rna</i> | <i>pirda-lhuku</i> | <i>ngurngku-ma-</i> |
| | | | <i>lhuku-ki-thi.</i> |
| | Powder-make-IMP | beat-HIST | ash-make-HIST-EMPH. |

34. D. I don't like it when they smash'm up and fine and smooth'em, I hate the smell. Ugh!

35. One day my old *kadnhini*⁴ been tell me,

<i>thika-rnawu!</i>	<i>anthunha</i>	<i>mani-lhiku</i>	<i>wirinja-nga</i>	<i>pardi pulhpa!</i>
Return-IMPV!	Mine	get-PURP	nest-LOC	grub powder!

36. I went home and I got this bag and I smelt it,

pardi pulhpa.
Grub powder.

- | | | | |
|-----|-------------------|--------------------|-------------------------|
| 37. | <i>kawa-lhuku</i> | <i>mathapurda!</i> | <i>thawi thika-rna.</i> |
| | vomit-HIST | old man! | Throw return-IMP. |

- | | | | | |
|-----|-----------------|-------------|------------------|--------------------------|
| 38. | <i>minha-ku</i> | <i>untu</i> | <i>thawi-ra,</i> | <i>wadla-kunha-</i> |
| | What-DAT | you | throw-PUNC, | <i>thu?</i> ⁵ |
| | | | | hungry-POS-EMPH? |

39. I didn't answer the old lady, I was too busy vomiting.

Translation

1. M. They would all go out in the green feed time, it was then that they would sing to make them breed up more, those grass witchetty grubs. They used to eat them, I wouldn't.
2. D. I wouldn't. I used to see old people digging a hole.
3. M. (Pieces of) wattle and sandhill wattle, they would use them like a broom.
4. D. With this sandhill wattle they used to collect them together (those grass witchetty grubs), they would liven them up and make them move.
5. M. They pushed them into this small hollow.
6. D. They heated them up in a fire, they cooked them there. Children were not allowed to be there.
7. They built up a fire and sat there secretly.
8. M. We were not allowed to go there where they were cooking, the old ladies. Boys were not allowed to come near.
9. D. They would have the fire ready. One did this while another got the smoke to go into one place. They smoked (the grubs).
10. They (made a number of fires like that) all at the same time, all level.
11. Then they would take the guts out (of the grubs). They tore them open and picked the grass out of them. They got the guts out.
12. L. There is grass inside?
13. M. That green stuff.
14. D. From when they eat grass. They tore them open and got the guts out.
15. M. They took the head off, and tossed them down, all hot.
16. D. They threw them down after they had torn them open.
17. M. They dried them out, they got all the moisture out (in a stream of smoke) like from a motor-car (exhaust), but you were not allowed to see that.
18. Boys were not allowed.
19. D. Girls were not allowed to be there either. They chased them off.
20. M. They would cook all the grubs on one day.
21. And then in a couple of days time when they were quite dry, they would pound them and smash them up.
22. L. What about little birds?
23. M. They had plenty to eat, they wouldn't go near there.
24. They used to pound (the dry grubs) with a nardoo stone and beat them and smash them to powder.
25. Then some (old women) would put them into bags. They kept (the grubs) in bags after they had ground them to powder.
26. You were not allowed to see that either, ha ha! They were very particular.
27. D. And when they came to eat that, they got yellow ochre and red ochre and painted their mouth with it.

28. They got red ochre and yellow ochre and pipeclay. They painted their mouth,² The red ochre we call *arkapa*.
29. M. *untharna* is what we called the pipeclay, there was *untharna* and the red stuff. The (ordinary) white gypsum was not used, only the pipeclay which was also called *yikurla*. We got it from far away to the west, from the Musgrave Ranges, from Antikirinja people. We had a place too where you could get it from, *URara*, that is out from Granite Downs.³
30. L. After they had put that ochre on, then they could eat it?
31. D. Yes, after. Or else they would get a sore throat.
32. M. They reckon it is good after it has been dried out, just the same as with fruit, you can dry it out and put it through a (milcing) machine, in exactly the same way.
33. They pulped (the dry grubs), they turned them into a meal as fine as ash.
34. D. I didn't like it when they smashed up the grubs and made them into a powder, all fine and smooth. I hated the smell. Ugh!
35. One day my old maternal grandmother⁴ said to me: 'Go back home and get my grub powder. I have got it in a 'nest' (a type of head-band for carrying things).'
36. I went home and got this bag and I smelt it. It was grub powder.
37. I tell you old man, I vomited! I threw it down as I was walking back to her.
38. (My grandmother said): 'Why do you throw it away? It's perfectly good food!'
39. I didn't answer the old lady, I was too busy vomiting!

CONCLUSION

In their book, 'The World of the First Australians' in a discussion of hunting and gathering, R.M. & C.H. Berndt state (1964: 104): 'Typically there is a magic associated with hunting, but not as a rule with food-collecting'. The collection and preparation of grass witchetty grubs was one of those exceptions to the general rule. There was magic and secrecy connected with it. In the Diari tradition quoted by Reuther it was a male ancestor who collected and prepared the grubs. Among Wangkangurru and Yarluyandi people, as shown by Dora Parker and Mick McLean, this activity was entirely restricted to old women: this is in keeping with general traditions, as it is usually women who collected smaller items and who do the tedious job of grinding. The fact that grass witchetty grubs only appear during very restricted periods no doubt brought about the feeling that this was a special occasion. It is not surprising that the preparation of the grubs came to be marked by prohibitions.

In the Lake Eyre Basin there were very few sites that were secret/sacred and exclusively reserved for only men or only women at all times. Secrecy was not so much site-specific and in at least some cases it reflected an attempt by special groups of people to get away from ordinary camp life, to have some privacy and not to be disturbed. The ritual

associated with the preparation of grass witchetty grubs illustrates this.

ENDNOTES

1. The text transcribed in this paper was recorded in January 1967 as field-tape 65. A copy has been deposited with the Australian Institute of Aboriginal Studies in Canberra. For ease of reference the text has been split into numbered sections. The divisions are on the whole in accordance with intervals in speech. In the paper a practical orthography has been used for Wangkangurru: Plosive consonants other than the retroflex plosive have been written as unvoiced, (*k, p, th, t*), but prestopped consonants have been written with voiced plosives as this corresponds most closely to the pronunciations, hence: *bm, dnh, dnj, dl, dlh*. Retroflexes have been written as *r* + consonants, i.e.: *rl* is retroflex *l*; *rn* is retroflex *n*, *rd* is retroflex *d*. Interdentals have been written as consonant + *j*, hence *nh, th, lh*. Palatals have been written as consonant + *j* hence *tj, nj, lj*. *ng'* has been used for velar nasals. The three r-sounds have been transcribed as follows: *r* = the alveolar flap; *rr* = the trilled r; *R* = retroflex *r*.

The following abbreviations for linguistic terms are used in the interlinear gloss:

ABL	Ablative case	IMP	Imperfective
ACC	Accusative case	IMPV	Imperative
ACT	Active stem-forming suffix	LOC	Locative case
CAUS	Causative case	NAR	Narrative past

CONT	Continuous participle	PAST	Past tense
EMPH	Emphatic clitic	POS	Possessive suffix
PURP	Purposive	PUNC	Punctiliar past
ERG	Ergative case	SP	Speed form, indicating action undertaken
HIST	Historical past	TR	Transitory aspect

2. Painting of the mouth connected with the eating of particular items is also known from another ritual practice: people involved in the ritual cannibalism connected with one type of Ngamani rain-making ceremony painted their mouth black. Mick McLean corroborated Reuther's comments on this and said he had heard of it from older people, particularly from the distinguished old Ngamani rain-maker *Dinta* 'Sandy' (for an account of an interview with *Dinta*, see Farwell 1950: 53).

3. The Granite Downs area long ago was Aranda. However, when Antikirinja Western Desert people reached

the area, there is reputed to have been a 'war'. But, there was also gradual infiltration and ultimately there were no Aranda people left in the area. Mick McLean, through his Aranda grandmother, often identified himself with Aranda people. Naturally he still knew what the original boundaries were; this is why he said 'we had a place'. There was also a pipeclay mine to the east of Lake Eyre at Powana Hill in Ngamani country. Since there were not many sources of pipeclay, it was a much more precious source of paint than powdered gypsum.

4. Dora Parker's maternal grandmother was the last surviving full Yarluyandi, Judy Trew *Thantripilinha* ('small poisonous snake'), a woman famed for both her knowledge and courage (see Morton 1976: 17).

5. The very common Wangkangurra expression: 'It's good food for someone who is hungry' does not imply that the food-stuff in question is inferior. It means simply that something is a normal, acceptable item of food.

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ABORIGINAL FIELDWORK IN SOUTH AUSTRALIA IN THE 1940S AND IMPLICATIONS FOR THE PRESENT

R. M. BERNDT

Summary

This paper is a slightly revised version of a paper delivered to the Anthropological Society of South Australia on 17 November 1988 in Adelaide. Based on the author's fieldwork in the 1940s in South Australia, it looks at Aboriginal people and their changing circumstances in four major locations : Ooldea on the west coast, the northern region of South Australia centred on Oodnadatta, the Narrinyeri in the south-east and Aborigines in Adelaide.

ABORIGINAL FIELDWORK IN SOUTH AUSTRALIA IN THE 1940S AND IMPLICATIONS FOR THE PRESENT

R.M. BERNDT

BERNDT, R.M. 1989. Aboriginal fieldwork in the 1940s and implications for the present. *Rec. S. Aust. Mus.*, 23(1): 59-68.

This paper is a slightly revised version of a paper delivered to the Anthropological Society of South Australia on 17 November 1988 in Adelaide. Based on the author's fieldwork in the 1940s in South Australia, it looks at Aboriginal people and their changing circumstances in four major locations: Ooldea on the west coast, the northern region of South Australia centred on Oodnadatta, the Narrinyeri in the south-east and Aborigines in Adelaide.

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It gives me great pleasure to speak at this meeting of the Anthropological Society of South Australia: it must be well over 40 years since I last did so. In those days the Society was a closely knit one, although only a couple of its members had been trained in Anthropology. Moreover, there was some tension between the University of Adelaide's Board for Anthropological Research and the Sydney Department, then under the direction of Professor A.P. Elkin: it was the issue of amateur *versus* professional.

In the late 1930s, I was appointed an honorary assistant in Ethnology at the South Australian Museum. This appointment represented the turning point of my career. Aborigines from many areas regularly visited the Museum, and it was possible for me to make friends with many of them. I was interested in living people, and less inclined to devote my attention solely to material objects. It was in this context that I first met Albert Karloan, who became my spiritual father and mentor. Through myself, Karloan wished to fulfil his primary concern of recording all he knew about the traditional life of the Narrinyeri, and the changes that had taken place over the years. I began working with him in 1939 at Murray Bridge. Other Aborigines also made claims on my time. Ted Vogelsang at the South Australian Museum, for instance, introduced me to Dieri speakers; and, through Karloan, I was able to work with Ngadjuri and other men. In a sense, the field was so wide I had difficulty in selecting cultural areas for concentration.

In that same year, I was invited to accompany a University of Adelaide Anthropological Expedition to Ooldea on the west coast of South Australia. This was an exciting and crucial event that firmed up my ideas of devoting my career to anthropological research. First, however, I needed professional training. With the encouragement of J.B. Cleland, T. Harvey Johnson and C.P.

Mountford, I went to Sydney to arrange matters with Professor Elkin. The Department of Anthropology at the University of Sydney was then the only place in Australasia where Social Anthropology was taught to graduate level. It was there in Elkin's room, at the beginning of the 1940 academic year, that I met Catherine, who had come from New Zealand to study Anthropology. In the following year we were married in Adelaide and went to Ooldea.

In the early 1940s we returned to South Australia to attempt what I would now regard as virtually an impossible task — of getting to know the different socio-cultural traditional and near-traditional Aboriginal lifestyles, together with an assessment of the magnitude of changes that had been imposed on these people. Of necessity, we had to be selective, but we travelled quite widely throughout the state before deciding on which areas to concentrate. We settled on four main ones. We would have liked to look at these in the form of a gradation, or range — from outback to urban, from low-risk to high-risk alien contact; but that was not practicable. Ooldea was included because we had already obtained detailed research material there. We had a deep-seated commitment to the lower River Murray-Point McLeay areas, and we had not yet fulfilled our promise to Karloan to settle down with him, and at the same time to meet many of the Narrinyeri people. That took priority. It introduced us also to Narrinyeri 'outliers' within the city of Adelaide. That, in turn, helped us to meet people from Point Pierce, and the mid-north generally, as well as other far northern areas. Most of our work in Adelaide was carried out in the homes of our Narrinyeri and other friends, as well as at my father's place in Rose Park. But also I was able to spend long periods with transient visitors to Adelaide, as well as local people, in Light Square, Whitmore Square and, occasionally, Victoria Square. We also met at the South Australian

Museum or, where elderly men were concerned, at the Magill Old Folks' Home. In passing I should mention that, at Professor Elkin's insistence, we concentrated on the collection of detailed genealogies. This was particularly the case with the Narrinyeri, Point Pearce and mid-north people. Knowing the background of so many people had a considerable bearing on our research, and on acceptance by Aborigines on the basis of knowing and being friendly with a number of their relatives. We also intended to continue our research over several years. However, late in 1944 we were involved in a survey of Aboriginal labour on pastoral stations in the Northern Territory, a survey that was urgently required. Moreover, this was during the World War II period, and we were the only anthropologists working in the field at that time.

Port Augusta was also an important centre for local Aborigines, as well as those from the mid-north, and Kokata people who had originally occupied areas north of Eyre Peninsula, and Roxby Downs and who travelled along the transcontinental railway to Ooldea. Many of them visited Adelaide. The other area centred on Oodnadatta, with its own local setting, but with direct linkages to Ernabella and the Southern Aranda, as well as along the north-south railway.

Before embarking on the survey, we sent questionnaires to missionaries and Aboriginal Protectors (police); arranged through the Director of Education (Dr Charles Fenner) for essays to be written by school-children in all country and city areas; and spent a certain amount of time in the South Australian Archives to obtain something of the state's historical perspective. Moreover, we had access to early police records for all the main areas in which we worked.

The following is a brief summary of each of our main research areas. I restrict myself to two features: one, with reference to the Aboriginal socio-cultural heritage; the other, relating to the changes that had taken place, and the impact of these on contemporary Aboriginal living. I recognise, of course, that to make a 'jump' from the 1940s to the late 1980s is an indefensible procedure. Nevertheless, on a number of occasions I have held that, at any particular period of the life of an identified group of people, the 'writing is on the wall' for those who wish to read it. The sad fact is that many do not — even those who are directly involved.

OOLDEA

Ooldea was a time-honoured meeting place for many Western Desert people, long before a mission station was projected into its perspective. In the early 1930s and 1940s, family groups from various parts of the so-called Desert were making their way

to the fringe settlements — not just because of bad seasons, but out of curiosity. Traditional communication networks had been spreading stories of a different people with a multitude of possessions. Ooldea, established in 1933, was one of their objectives. When we were working there in 1941 (Fig. 1), that process was continuing. It was their first experience of Europeans: not only missionaries, but gangers and settlers, as well as passengers on the transcontinental railway, including Army personnel. The mission attracted Kokata people from the east, and some Aborigines from Zanthus and Kalgoorlie.

At Ooldea, the main missionary's task was to Christianise and Europeanise the Aborigines, but he had no knowledge of the local language. So he concentrated on other associated activities. As new arrivals appeared on the horizon, he and his helpers rushed to 'clothe the naked savage'; he tried to disperse initiation camps; and he collected ritual boards, that were then sold in Adelaide. This caused considerable strife and resentment, but did not detract, then, from the continuation of ritual life. On the other hand, people's introduction to a new diet did have considerable ramifications, and not solely in the sphere of health. Rations were distributed, especially to children and adults who attended church services. In 1941 the local people relied heavily on introduced food in contrast to bush foods. Gathering of indigenous food resources was severely diminished. Nevertheless, people talked incessantly about every aspect of it. Both Catherine and I were told literally hundreds of stories and firsthand accounts regarding such activities. They were useful in learning the Andingari and Yangandjara dialects, but they did not reflect the reality of what was then the present scene — although they were intended to do so. To supplement what was available at the mission, people began begging for food or for money from the train passengers or selling tourist items. In such circumstances, their traditional socio-economic system was not only undermined but crumbling. The dice were already loaded, and almost total dependence was not far off.

The missionaries had only mixed success in tackling the belief system of the adults, so they concentrated on the children. Almost everything taught within the rather primitive school was of non-Aboriginal derivation. Children were often free to wander about (Fig. 2), around the settlement, and their interests in this other kind of living were gradually enveloping them. That, in turn, widened the gap between themselves and their parents and adult relatives. Increasingly, knowledge or information that should have been passed on normally to the youth of the community was being limited, or in many cases withheld.



FIGURE 1. One of R. Berndt's 'working camps' at Ooldea, western South Australia, 1941. (Photo R. Berndt WU/P18542.)



FIGURE 2. School children digging a soak at Ooldea U.A.M. settlement. (Photo courtesy H. Green, 1941.)

Adults were outspoken regarding their own position. Most of them emphasised that they were not tied to the mission, nor were their children; that they could return to their home territories without effort on their part. But such was not really the case. Moreover, the South Australian Aborigines' Protection Board decided in 1942 to move the Ooldea people. We opposed this on several occasions, to no avail. Additionally, a little later Maralinga was being established, and that restricted Aboriginal movement throughout a good deal of the Western Desert. If an enlightened Aboriginal policy had been in operation, with trained anthropological staff, it could have been possible to have stemmed the steady drift of the Ooldea people toward virtually an anomic situation, and to have reconstructed a viable community. Eventually, they found themselves at Yalata. The story, as most of you will know, does not end there: more recently, some of them have returned to an area within the vicinity of Ooldea.

NORTHERN SOUTH AUSTRALIA

The northern area straddled, socio-culturally, parts of south and central Australia, with Oodnadatta as the focal township. Its heterogeneous population consisted of a residue of local people drawn from areas around Marree north to the Finke, supplemented by Southern Aranda and Western Desert people.

Three groups or categories of Aborigines were distinguished, hierarchically positioned below the Europeans. The first, speaking only English, lived in reasonably pleasant houses and were usually employed on a more or less regular basis — but were reluctantly accepted by the European townsfolk (Fig. 3). The second consisted mainly of women married to or living with European men. Their style of living did not differ markedly from members of the first group, but their houses did. These women spoke Aboriginal dialects, but did not normally attend camp ceremonies. Their interaction with other groups was minimal.

On the open plain, on the outskirts of Oodnadatta, were Western Desert and Southern Aranda people arranged spatially as two overlapping camps: they were supplemented by Aborigines coming in from Ernabella to the north-west and beyond, even though Ernabella was originally established as a buffer between so-called 'bush' people and those working on pastoral stations and in the town (Fig. 4). Members of this third group were primarily regarded as being traditionally-oriented and maintained their ritual and other responsibilities. However, among them were station Aborigines spending rest-periods there. Windbreaks and huts built of old iron, bagging etc. were the normal shelters, with no amenities except

for the provision of water. Occasionally, they were employed on menial tasks in the township and on the surrounding stations (Fig. 5). The people were dependent on introduced commodities, because food-collecting and hunting had become difficult on account of the cattle and sheep pollution of the water-holes and the general condition of the countryside as a result of cattle-running.

These three groups were relatively isolated from one another, and the position of each within Oodnadatta's compartmentalised society was conditional on their measure of Aboriginality. The less one had of that, the more grudgingly acceptable one was to the dominant European group.

Beyond Ernabella and within the central ranges, many 'bush' Aborigines had had little or no alien contact. Certainly, many of them would have visited Ernabella, but many had not. However, the long arm of the 'civilising' process stretched out in the shape of the Oodnadatta police, who had jurisdiction over this part of the country. In the 1930s and early 1940s, cattle and sheep spearing was rife, with damage to station property, and occasional murders and theft. There were no examples of liquor-related offences at this time. Mostly, Aborigines were reacting against the intrusion of Europeans into their country, the depletion of food resources, bad treatment on the stations, and interference with women. The police expeditions traversed wide areas of country in search of witnesses and culprits. 'Prisoners' were usually available, whether or not they were the primary instigators in a particular incident. They were brought back to Oodnadatta, sometimes with neck chains. If the charges were serious, they would be sent down to Port Augusta; otherwise they were tried locally and if found wanting were retained at the police station for gardening or other odd jobs. Incidentally, people in this area had experienced the severity of punitive measures that had been wound down by the 1940s; but, as would be expected, these nurtured bitterness among Aborigines and fear of the police who were simultaneously 'Protectors of Aborigines'. I should mention that we were able to record in writing most of the early and recent (up to 1944) cases that were entered in the police books held at Oodnadatta and Port Augusta. However, we heard later that most of the more detailed documents had been destroyed in a fire at Port Augusta. We had tried to persuade the police there to have these lodged in the South Australian Archives.

The third group of Aborigines I mentioned, who lived on the outskirts of Oodnadatta, was originally recruited from such 'bush' people. Many did not return to the central ranges — not at that time. They brought with them their traditional way of living which, while it temporarily sustained ritual activity



FIGURE 3. Race meeting at Oodnadatta, 1944. (Photo R. Berndt WU/P18543.)



FIGURE 4. Ernabella Presbyterian Mission station, 1944. (Photo R. Berndt WU/P18543.)

into the 1940s and beyond, was doomed to be drastically changed. Aborigines who were part of the other two groups had no use for it.

THE NARRINYERI

In contrast to the other two areas of our survey, we have the Narrinyeri, who originally occupied the Encounter Bay, Lakes, Coorong and lower River Murray areas; people who had experienced alien contact prior to the foundation of this state. I call them Narrinyeri, although traditionally they were referred to as the Kukabrag, and within that wider group several different dialects were spoken. Moreover, on the eastern shore of St Vincent's Gulf they interacted with the Adelaide Aborigines.

Initially, sealers from their stronghold on Kangaroo Island sought women from the mainland. The local people were powerless to act against them. Their hatred of these intruders engendered attitudes that had not diminished in the 1940s. They were also exposed to two primary 'waves' of smallpox prior to European settlement in their area, that decimated a large number of the people — to such an extent that they were unable to utilise adequately their own land and its natural resources as they had done before. Nor were they in a position to defend their homeland and themselves from external incursions. Isolated incidents of resistance did occur, but nothing on a wide scale. Some form of independence was possible away from European settlements: traditional life continued there, albeit in a modified way.

Point McLeay mission station was established in 1859 by George Taplin in the heartland of the Narrinyeri. In the face of hostile or disinterested outsiders, it was the only place within the whole area that constituted a reasonably safe refuge. In general terms, the presence of the mission provided a breathing space for the Aborigines; without it, disintegration of their traditional lifestyle would have been more rapid, and their ultimate chance for re-adaptation slender. It ensured their survival as an identifiable people, with long-term territorial associations. I will not go into the history of the mission, except to say that, on the negative side, Taplin's influence was directly and indirectly responsible for the breakdown in many features of traditional life. The elders — both men and women in authority, since equality of the sexes was a marked characteristic of Narrinyeri society — continued to resist blatant interference in their own affairs. However, they did not turn their backs on what Europeans had to offer, especially in relation to material goods and liquor.

The younger members of the community were under the direct influence of the mission, and a number rebelled against their elders; but many did not. It was possible in 1882, against the expressed

wishes of Taplin, for the last widely-attended initiation ritual sequences to be held. This was probably the last public attempt on the part of the knowledgeable leaders to impart traditional information to selected members of the younger generation. Albert Karloan was among the *narambi* novices.

The formal Narrinyeri *yanurumi*, a unique Aboriginal court in which both men and women participated, was winding down by 1860, when its punitive functions gave way to the European mounted police. It struggled on, however, attempting to resolve matters of an internal nature, until the death of King Peter Pulami in 1888. He would have been succeeded by his son, John Lelindjeri — but Lelindjeri had come increasingly under the influence of the mission.

The break with traditional culture became a reality with the passing of 'the old people' — the parents of, for example, Karloan, notably his father Taramindjeri; or the mother of Pinkie Mack (Fig. 6), Louisa Karpeny; and many others. The years between 1888 and the mid-1920s saw most of them gone. Of course, it was not a *complete* 'cut-off', since fragmentary knowledge survived. But in terms of living according to Narrinyeri conventions, it was. Overwhelmingly, that background was being crowded out by European elements; and the impact of what came across as mainstream Australian society and culture had priority in contemporary living (Fig. 7). There were, however, special persons (men and women) who were concerned about the retention of their historic heritage: their survival continued only into the mid-1940s, or a few years beyond.

There are two crucial features that sustained Narrinyeri identity. One, even though Narrinyeri men and women contracted unions with non-Narrinyeri people and non-Aborigines from different areas (and that in itself was no recent occurrence), the Narrinyeri 'family' circle persisted, with the retention of the old personal and family names derived from their traditional past. Two, while people had been moving out of their home territories over a number of years, establishing branches in the city of Adelaide and elsewhere, they did not lose touch with their own kin or with their country of origin. While this does not mean detailed knowledge of dialectal and clan territories, along with the relevance of mythic sites and so forth, it does involve knowing where they belong, and something of the available resources within their land. This is, in fact, a remarkable achievement on their part, in the face of heavy pressures toward absolute assimilation into the wider system.

ADELAIDE

The situation in Adelaide in the early 1940s was complex. Most Aborigines lived in the 'West End',



FIGURE 5. Aboriginal stockmen at Macumba, northern South Australia, 1944. (Photo R. Berndt WU/PI8535.)



FIGURE 6. Mrs Pinkie Mack, Piltindjeri clan, Yaraldi dialect, with two of her grandchildren. A daughter of Louisa Karpeny, she lived at Brinkley on the lake entrance to the River Murray in 1943. She was a close friend of R. & C. Berndt. (Photo R. Berndt WU/PI8537.)

which was not the most salubrious of the city's areas. Also, its mixed population included other non-Europeans as well as Aborigines. The permanently resident Aborigines interacted with Aboriginal transients drawn from the mid-north and elsewhere. There was less negative discrimination and prejudice between people in all these 'groups' than between, for example, Aborigines and Europeans living outside the precincts of the inner city, who were mostly categorised as being economically better off. Aborigines who did live outside the city in the suburbs, generally severed connections with their kin living in the 'West End'. Many of them were virtually lost within the wider society, to emerge later as identified Aborigines when recognition of Aboriginality became politically acceptable.

Apart from these people, internal relations between Aborigines themselves were on the whole amicable, although arguments tended to flare when alcohol came into the picture. During this period Aborigines were forbidden to obtain liquor — although there were many avenues of access to it. Men who had been (or who were still) in the Army were strongly critical of this prohibition. This was a profitable field for police action: raids were constantly being made. Non-Aborigines talking to Aborigines were also a target — as I was on several occasions when drinking lemonade with my friends. We were forced to open any bottle we had, to enable plain-clothes officers to smell and even taste what was in it. Most Aborigines lived under the shadow



FIGURE 7. Seasonal grape-picking at McLaren Vale, South Australia, in 1944. The people participating were of Narrinyeri descent. (Photo R. Berndt WU/P18536.)



FIGURE 8. Barney Waria (or Warrior) and Jim Mooney, both men of Ngadjuri descent, 1943. They were close friends of R. Berndt and, when they were in Adelaide, spent much time with him. (Photo R. Berndt WU/P18534.)

of 'offences' of one kind or another, most of a minor nature, and resented doing so. Women, particularly, read the local newspapers regularly to search for references to relatives and friends who had been unfortunate enough to appear before a court of law. External relations, on the other hand, were focused primarily on the Aborigines' Protection Board, that was used as a butt for all kinds of controversial matters. Constant visits were made to complain about the indifferent social conditions and/or to extract government aid. The Chief Protector was, with good reason, disliked by all Aborigines and by ourselves. Violent quarrels often resulted from trivial affairs that *could* have been resolved by the Board without too much difficulty.

While many Aborigines aligned themselves with Europeans and with the government, in general terms, many — the majority — did not. Bitterness and discontent were most marked because of the rebuffs they experienced as being 'coloured' people. Those Aborigines who did sever their ties with relatives in order to 'disappear' within the wider community, hoped to avoid what was then regarded by so many Europeans and Aborigines alike as the stigma of being 'coloured'. On the other hand, many resented the fact that their own traditions and culture had been more or less deliberately destroyed.

Two letters of interest in this connection appeared in the *Adelaide Advertiser*, the first on 28 January 1944 and the second on 1 February 1944. George Rankine, a Narrinyeri descendant, made a plea to the general public to give Aborigines 'some justice, sympathy and understanding'. He mentioned the destruction of Aboriginal culture, emphasising that nothing could compensate for its loss. Material benefits were all very well, he said 'but we need something which Australian-European society, with all its unrest, its inequalities and its intolerance, has not been able to provide'. 'We are hoping', he continued, 'that the future may bring something better'. Barney Warrior (Fig. 3) supported Rankine's letter, adding that 'people are too ready to judge without understanding, and most like to think that anyone with a dark skin cannot possibly be as good as they are themselves'. Continuing, he said, 'Those of us in the city are living the same way as white people, yet because of our colour and descent (in which there is after all a lot of white blood) we are not socially accepted. They talk about equal opportunities and treatment, and yet we ourselves know very well the things that are said about us, even by people who profess to feel kindly toward us'.

In a nutshell, these two letters provided a summary of Aboriginal feelings in Adelaide in the 1940s: but they also strike a contemporary chord. They were sufficient to stimulate us to write 'From Black to White in South Australia', which we originally entitled 'This way to freedom!' — although the publisher preferred the other title. It was 'freedom' that they wanted, to throw off the shackles of obsolete and ethnocentric rules and regulations. Aborigines at that time were talking about the abolition of exemption certificates and the need to recognise them as Australian citizens — weren't they 'the only real Australians'? Moreover, they wanted to manage their own reserves as independent settlements. To achieve this they set up small committees, many of which were doomed to failure since some Aborigines feared the repercussions of the Aborigines' Protection Board, and the power to withhold benefits or do harm to individuals. (The two letters I mentioned above engendered some ill-feeling among members of the Board.) Suggestions were also made by Aborigines that the Board should establish advisory committees — or, at least, appoint an Aboriginal representative. But there was no response. Approaches were made to the government to scrap the old *Aboriginal Act* — again, without any positive result.

Interaction with Aborigines of differing backgrounds and experiences visiting Adelaide from as far afield as Victoria and New South Wales, including some who had been attached to the Army, produced lively discussions that were based on attitudes and views which had not been generally

heard before, or not so explicitly, by the majority of local Aborigines. The war had irrevocably altered conditions in the city, but not to any extent in country areas. The catalysts were those persons who had travelled and mixed widely with non-Aborigines. What they had to say was not far beneath the surface of the thinking of local people; they simply provided the opportunity for them to express their views. Within this context, the issue of land was raised. 'The richest land was taken away from us and no compensation was offered'; that was often repeated. Economic security was the keynote, but many people recognised that without adequate education that aim could not be achieved. 'If we get money, we'll be all right!' was noted by several men. 'The thing to do is to be cunning like a white man and beat him at his own game! Aborigines had to stand up for themselves, otherwise government policy would not change!' Many Europeans regarded such views as revolutionary, promulgated by 'rabble-rousers'. But that was far from the truth of the matter. The climate of Aboriginal affairs was about to change, just as drastic changes were taking place in post-war Australian society in general.

Finally, it would seem clear that in the early 1940s, social conditions for Aborigines generally were far from satisfactory. In the north of the state and at Ooldea, the only means of rescuing traditional ways of living was to remain away from European settlements. That, however, was virtually impossible. Being faced with an enforced adaptation to a way of life they knew little or nothing about, confused the issues. Guidelines were not available. It was a matter of doing what they could, on their own initiative, as a matter of survival: the implications of such actions were unclear or unknown to them. Government intervention was negligible. Any positive policies that had been formulated were not enacted until well after the cessation of the war: and their implementation was a long-drawn-out business.

The long history of Narrinyeri contact with non-Aborigines placed them in a special position *vis-à-vis* adaptation to changing ways. But that did not save them from losing their living traditional culture and social imperatives. In a different respect, they were able to retain their unique identity as a people with recognised rights and obligations. That was possible through their high degree of acceptance of Australian-European living patterns and values.

Adelaide provided opportunities for a diversity of opinion and action, that had the potential for achieving their expectations of fairer treatment and eventual equality with other members of the wider community, without loss of identity.

There are two points I should mention here. One, Aborigines all over the country, whether or not they are traditionally oriented, are becoming increasingly committed to an Australian-European type of lifestyle and belief system, in varying degrees. Two, a growing awareness of the uniqueness of their own heritage is being counter-balanced by the

construction of an overall, generalised, Aboriginal heritage, that could override the survival prospects of particular regional heritages relevant to many different Australian Aboriginal cultures. This is a crucial point — but it is one about which Aborigines themselves must make up their minds.

FURTHER EVIDENCE OF THE CHARADRIID AFFINITIES OF PELTOHYAS AUSTRALIS (AVES : CHARADRIIDAE)

J. FJELDSA & B. NIELSEN

Summary

The Australian dotterel *Peltohyas australis* (Gould, 1841) was originally placed in the plover genus *Eudromias*. Sharpe (1896 : 307) erected a monotypic genus *Peltohyas* and subfamily for it, but kept it in the Charadriidae. Mathews (1913-14) suggested that it was a courser (Glareolidae) and Lowe (1931) supported this view with anatomical evidence. This taxonomic shift was accepted by Peters (1934). Jehl (1968) found that the *Peltohyas* chick was similar to those of *Cursorius* and *Rhinoptilus africanus* in colour, pattern and feather structure. Lowe's arguments were, however, refuted in the thorough anatomical studies by Bock (1964), Yudin (1965,1978), Burton (1974) and Strauch (1978), who all concluded that *Peltohyas* has the anatomy of a typical plover. Evidence from behaviour (Maclean 1973, 1976) and ectoparasites (Emerson & Price 1986) point in the same direction. However, no one has reconsidered the arguments of Jehl, and no one has discussed where this peculiar desert fits into the phylogeny of plovers.

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We examined the poorly-made specimen of a downy chick on which Jehl based his view (Australian Museum reg. no. 610162), and have also studied two new and better-preserved chicks (South Australian Museum reg. nos B 37686 and 38525) and colour slides provided by Mr J. Hobbs and slides in the Photographic Index of Australian Birds, National Library, Canberra. On the basis of comparison with downy young of practically all other shorebirds of the World, and some anatomical specimens, we hope to reach a more precise conclusion concerning the systematic position of the Australian dotterel. The anatomical terminology follows Baumel (1979).

ULTRASTRUCTURE OF THE NATAL DOWN

Down from the dorsal tract of three *Peltohyas* chicks was examined by Scanning Electron Microscope (SEM), and was compared with corresponding down of 72 other species of shorebirds. Figure 1 shows SEM micrographs of down of *Pluvialis*, *Peltohyas* and *Cursorius*. The *Peltohyas* down closely resembles that of typical charadriids, with moderately dense, basally twisted radii that alternately turn ventrally and dorsally to the ramus, and possess marked nodes near the cell borders of the pennulum, which is relatively long (apomorphy of the Charadriidae). There is no dextral twisting of the ramus, as seen in many Scolopacidae.

The down of *Cursorius* and *Rhinoptilus* (Glareolidae) is very different, resembling down of sandgrouse, Pteroclididae (Fjeldså 1976). In these groups, the flattening of the basal portion of the ramus continues to the proximal part of the pennulum; the barbules are therefore stiff and not twisted as in normal avian down. The barbules are also packed exceptionally closely, so that each ramus with its radii forms a distinct single-plane structure resembling a minute contour feather. The ventral down is, in some of the coursers, very thick with extremely long terminal filaments.

Many plovers of hot and arid climates have short down with a somewhat scale-like appearance, which apparently misled Jehl (1968). The SEM study shows that the natal down of *Peltohyas* is not specialised in the way shown in coursers.

COLOUR PATTERN OF THE DOWNY PLUMAGE

The *Peltohyas* chick is light pinkish-buff to light fawn with some whitish areas on the hindcrown, laterally on the dorsal tract, throat and belly, and with numerous black markings, the largest of which have tawny-buff centres. The general coloration and expression of a pattern resembles that of certain coursers, especially *Cursorius cursor*, and differs from that of most plovers. Because of the perfect crypsis of these chicks, however, we judge the colour hues and presence of a pattern as such to be unreliable as clues of systematic affinity. The precise organisation of the pattern is less likely to be adaptive, and may instead indicate the genealogical affinity (Fjeldså in press).



FIGURE 1. Drawings made from SEM photos of the middle portion of a radius of dorsal natal down of (from left to right) *Pluvialis apricaria*, *Peltohyas australis* and *Cursorius coromandelicus*. Note that the *Pluvialis* down has been partly turned, to show how alternating pairs of cilia turn dorsally and ventrally.

Although the pattern of the *Peltohyas* chick (Figs 2 and 3) is ill-defined and somewhat variable amongst individuals, it generally resembles that of plovers, with no indications of the two big back patches of *Rhinoptilus cinctus* or the peculiar lattice pattern of the chicks of at least four other courser species. Plover-like traits comprise the kind of spotting, the transverse bands of the hindcrown and the organisation of markings along the dorsal tract. The whitish crescent on the posterior crown is found only in a small part of the Charadriidae (and in *Pluvianus aegyptius*). The crescent is particularly conspicuous, contrasting with a dark nape, in *Charadrius melanops* and *tricoloris* (FjeldsÅ in press, Fig. 1), *Hoploxypterus cayanus* and *Pluvianus*; the pattern being less clearly outlined in *Peltohyas*, *C. modestus*, *Erythrogonyx cinctus* and probably in *Plegornis mitchellii* and *Oreopholus ruficollis*, and very weak in *C. novaeseelandiae* and *Anarhynchus frontalis*. The typical sand- and ringed plovers of Boek (1964) have instead a white nuchal collar situated below the occiput, while most *Pluvialis* forms and the desert plovers *Charadrius morinellus*, *asiaticus*, *veredus*, *leschenaultii* and *montanus*, the apparently related *Pluviorhynchus* 'obscurus', as well as the lapwing *Chettusia gregaria*, combine hind-crown crescent and nuchal collar.

The finer details of the pattern of the *Peltohyas* chick are hard to recognise in other species, but indications are found in several of the above-mentioned species. The clover-like mark on the crown seems unique, but is possibly indicated in *E. cinctus*. Such differences as the pebbled appearance of *C. melanops* (reduced marks on the dorsum, reinforced black side-line and strong countershading), a more disrupted pattern of *E. cinctus*, and the less regular speckling in other

species, are likely to represent modifications conditioned by different habitats.

SOME FEATURES OF THE ADULT PLUMAGE

Peltohyas closely resembles the courser *Rhinoptilus cinctus* in its general 'desert colours', but is more *Charadrius*-like in pattern. The unique V-shaped breast-band could correspond to the median tapering of the breast-band that is special to *C. melanops*. *Peltohyas* agrees with some of the plovers that it resembles in natal characters, and with coursers, stone-curlews, oystercatchers, stilts and some other groups in having pale underdown and a very short lateral apterium of the neck. These are probably primitive character states. Small species such as *C. melanops*, *tricoloris*, and *novaeseelandiae* and *Erythrogonyx cinctus* agree with other plovers (viz. the majority of species) in these respects. Because these characters may be involved in heat regulation, parallelisms are likely to occur.

EVIDENCE FROM SKELETAL CHARACTERS

In order to examine whether the affinities suggested by plumage characters are compatible with other character sets, we examined skeletons of a number of shorebirds, and used published skeletal data. The review of 70 skeletal characters by Strauch (1978) showed very little variation within the Charadriidae. Owing to some apparent reversibility, and to doubts about the correctness of certain distinctions between primitive and derived character states, very few characters provide hints about the relationship of *Peltohyas* in other Charadriidae.



FIGURE 2. Heads of three *Peltohyas* chicks.

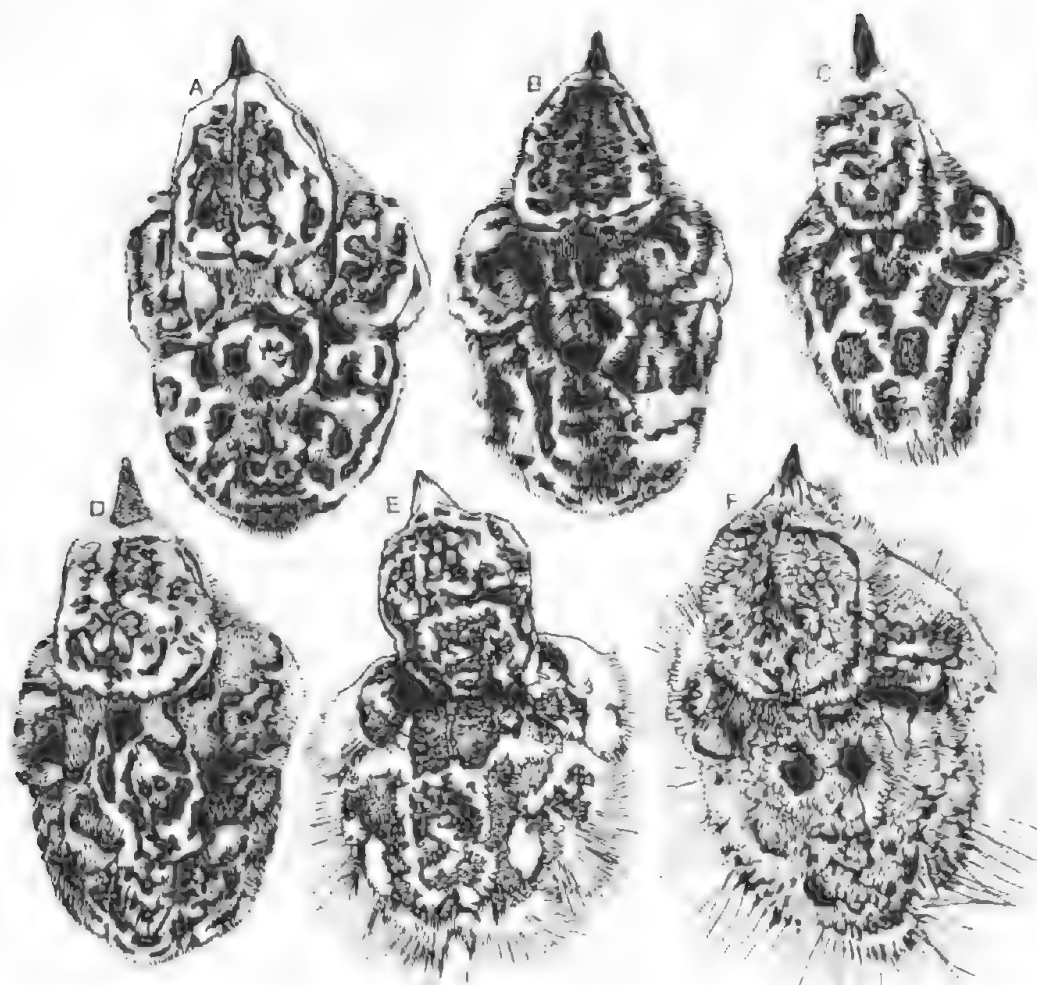


FIGURE 3. Dorsal colour patterns of newly-hatched chicks of A. *Charadrius morinellus*, B. *C. modestus*, C. *C. cinctus*, D. *Peltodyas australis*, E. *Rhinoptilus africanus* and F. *R. cinctus*.

Lack of supraoccipital foramina in *Peltodyas* is shared by stone-curlews, sheathbills, seedsnipes, certain lapwings, all gulls and curlews. This may be a primitive state, but may also be conditioned by a rather solid construction of the skull. *Peltodyas* shares a somewhat restricted attachment of *Musculus rectus capiti* with a number of small plovers, including *Erythronyx cinctus*, *Charadrius melanops* and *novaeseelandiae* and *Anarhynchus frontalis*. It shares a long suprategmatic process (derived state) with several of the plovers with which it shares natal characters. A peculiar broad triangular shape of the quadrate bone of *Peltodyas* (Bock 1964, Fig. 1) we found to be matched only in *Charadrius melanops*, but it is approached in *C. tricollaris* and *Hoploxypterus cayanus*. The general shape of the mandibles of *Peltodyas* is *Charadrius*-like (Bock 1964), and particularly resembles those of *C. melanops* and *tricollaris*.

The systematic unity of the species which *Peltodyas* resembles in natal characters is supported by a lack of a certain maxillopalatine strut in *Charadrius tricollaris*, *morinellus*, *dubius* and

vociferus, *H. cayanus*, *Plegadis mitchellii*, *Oreopholus ruficollis* and several *Vanellus* species and by an almost perfect agreement in Strauch's skeletal characters between the aberrant *Erythronyx cinctus* and *C. melanops*. In the absence of our own anatomical material of *E. cinctus* we have been unable to make further comparisons. Burton (1974) and Strauch (*op. cit.*) present evidence for transferring *H. cayanus* from the lapwings to near *Charadrius*.

CONCLUSION

Our study fails to corroborate Jehl's argument that *Peltodyas* has a courser-like natal plumage. We find it plover-like in all respects, but fail to find indications of close affinities with the large species groups of desert-, sand- and ringed plovers, or with lapwings. These can be defined by their own apomorphies, and may represent rather recent radiations. *Peltodyas* shares two unique character states with *C. melanops* (V-shaped pectoral band and triangular quadrate bone). Yet, we hesitate to

suggest that these are sister taxa within the Charadriidae, for all those species with which *Peltohyas* shares some peculiarities are rather aberrant members of the family, and do not form a closely knit group. Some are traditionally placed in monotypic genera, and of those previously lumped in *Charadrius*, *cinctus* has now been separated in *Erythrogonyx* (Condon 1975), *melanops* in *Elseyaornis* (Schodde 1982), *novaeseelandiae* in *Thinornis* (OSNZ 1970). The distribution of these aberrant forms covers Australia, New Zealand, South Africa and South America i.e. the Gondwanaland continents. It seems possible, then, that *Peltohyas* belongs in a paraphyletic group of species representing an early radiation of *Charadrius*-like birds.

Our data support the conclusion of Phillips (1980), based on behavioural data, that *Charadrius bicinctus*, *C. obscurus* and *C. alexandrinus* belong to the large desert- and sand-plover groups of *Charadrius*. However, *Anarhynchus frontalis* could, in our opinion, belong in the above-mentioned ancient assemblage of aberrant southern plovers.

ACKNOWLEDGMENTS

We thank L.P. Pedler, J. Reid and K. Caspersen for collecting the two downy chicks of *Peltohyas australis* now in the South Australian Museum, and Mr Shane Parker for providing these specimens as a loan, and for commenting on the manuscript. We also thank the curators of birds of the following institutions for their courtesy in connection with museum visits or loans of specimens: American Museum of Natural History (New York), Academy of Natural Sciences (Philadelphia), Australian Museum (Sydney), British Museum (Natural History) (Tring), Carnegie Museum (Pittsburgh), CSIRO Australian National Wildlife Collection (Canberra), Denver Museum (Denver, Colorado), Field Museum (Chicago), Louisiana State University Zoological Museum (Baton Rouge), Musée d'Histoire Naturelle (Paris), Museo de Historia Natural 'Javier Prado' (Lima), Museo de Historia Natural 'Bernadino Ricadavia' (Buenos Aires), Museo de Historia Natural (Santiago de Chile), Royal Ontario Museum (Toronto), South Australian Museum (Adelaide), Swedish Museum of Natural History (Stockholm), and the Zoological Museums of Moscow and Oslo. Slides of wader chicks were kindly supplied by P. Disher, N. Dreyer, J. Hobbs, A.C. Kemp, G.L. Maclean, G. Moon and E. Thomas.

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**SUPPLEMENTARY DESCRIPTION OF HETERODISPUS LONGISETOSUS
(WOMERSLEY, 1955) (ACARI: TARSONEMINA) A SCUTACARID SPECIES
FROM MUTTON BIRD NESTS IN SOUTHERN AUSTRALIA**

E. EBERMANN

Summary

Examination of the type series of the scutacarid mite *Heterodispus longisetosus* (Womersley, 1955), showed that important morphological details were neglected in the original description. It is thus appropriate to publish a supplementary description of the well-preserved material. I should like to express my thanks to Dr David C. Lee, South Australian Museum, for putting the type series at my disposal.

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Material examined: ♀-Holotype and 39 ♀-paratypes. In all there are 10 slides: slide no. N1987155: holotype- ♀ (marked) as well as further 4 ♀♀; slide no. N1987156: 2 ♀♀; slide no. N1987157: 5 ♀♀; slide no. N1987158: 4 ♀♀; slide no. N1987159: 4 ♀♀; slide no. N1987160: 5 ♀♀; slide no. N1987161: 4 ♀♀; slide no. N1987162: 4 ♀♀; slide no. N1987163: 3 ♀♀; slide no. N1987164: 4 ♀♀.

***Heterodispus longisetosus* (Womersley, 1955)**

Varietipes longisetosus Womersley, 1955: 429, Fig. 10A-B

Heterodispus longisetosus (Womersley, 1955): Mahunka 1965: 363, 381, Table 4, Fig. 13, 14; Mahunka 1967: 1299; Mahunka 1977: 96.

Supplementary description

Body size and integument: Owing to preparation, the animals are in different degrees of extension; for this reason, body length will be neglected. Clypeus width in μm : 177-247 (holotype 222); $\bar{x}$ ($n=35$) 207; $s=20$, 25; $v=9$, 78. Width of posterior sternal plate in μm , measured on the widest part in the region of setae 3c: 90-127 (holotype 110); $\bar{x}$ ($n=37$) 106; $s=10$, 03; $v=9$, 46. Entire body surface is finely punctated.

Dorsum (Fig. 1): Free edge of clypeus with radial stripes. Setae c1 and c2 with hair tubes. Cupulae ia and ip rounded.

Venter (Fig. 2, a): Illustration shows relative length of the ventral setae and their pinnation. Posterior genital sclerite is distinctly wider than long.

Setae: Setae ps1 and ps2 are pinnate; ps3 is present, at least half as long as ps1 and ps2, smooth (Fig. 1). Trichobothrium has a thin stalk and clubbed end with fine scales; trichobothrial setae are the same length (Fig. 3, a).

Legs: Leg I (Fig. 2, b-e): Formula of setae (solenidia in parentheses): trochanter 1, femur 2, genu 4, tibiotarsus 16 (4). Tibiotarsus distal with two setae sockets, no claw. Solenidia $\varphi_2 > \varphi_1 > \omega_2 \equiv \omega_1$. Leg II (Fig. 3, b): Formula of

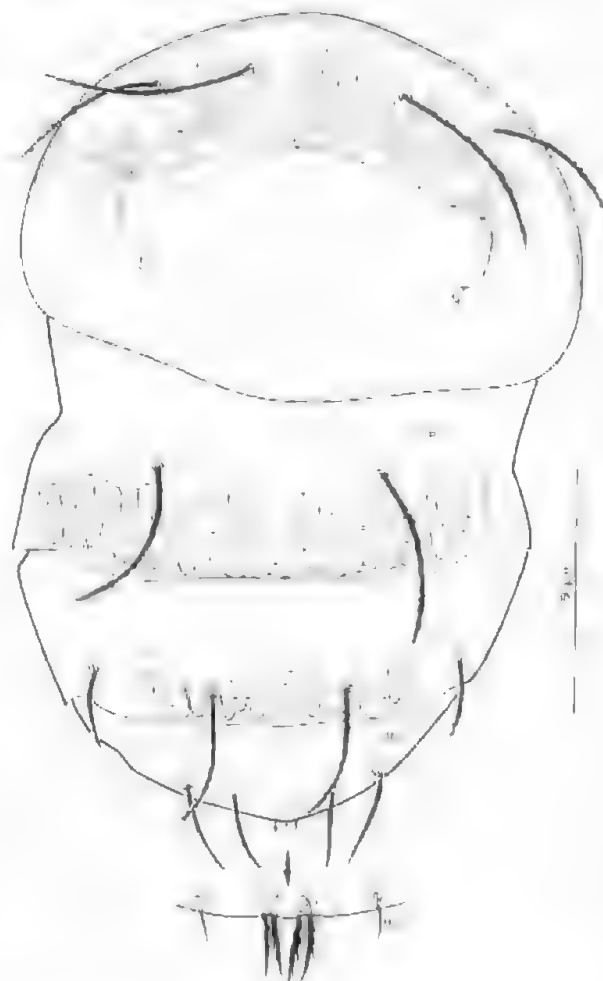


FIGURE 1. *Heterodispus longisetosus*, ♀ (holotype), dorsal view; setae ps1-ps3 in higher magnification.

setae: trochanter 1, femur 3, genu 3, tibia 4(1), Tarsus 6(1). Tarsus with small claws and pulvillus. Leg III (Fig. 3, c): Formula of setae: trochanter 1, femur 2, genu 2, tibia 4(1), Tarsus 6. Tarsus with small claws and pulvillus. Leg IV (Fig. 3, d): Formula of setae: trochanter 1, femur 2, genu 1, tibia 3, tarsus 4. Tibia and tarsus almost completely fused. Tarsus shortened; praetarsus strongly reduced, claw absent.

Variability: The material examined is not significantly variable for systematically relevant characteristics.

Systematic position

Heterodispus longisetosus resembles, mainly due to the rudimentary tarsi IV, the species *H. conquassatus* Mahunka, 1972, *H. mussardi* Mahunka, 1975 and *H. reductus* Mahunka, 1971, but differs from the first two in different positions of the setae 4a as well as in the relative length of the body setae. *H. longisetosus* differs from *H.*

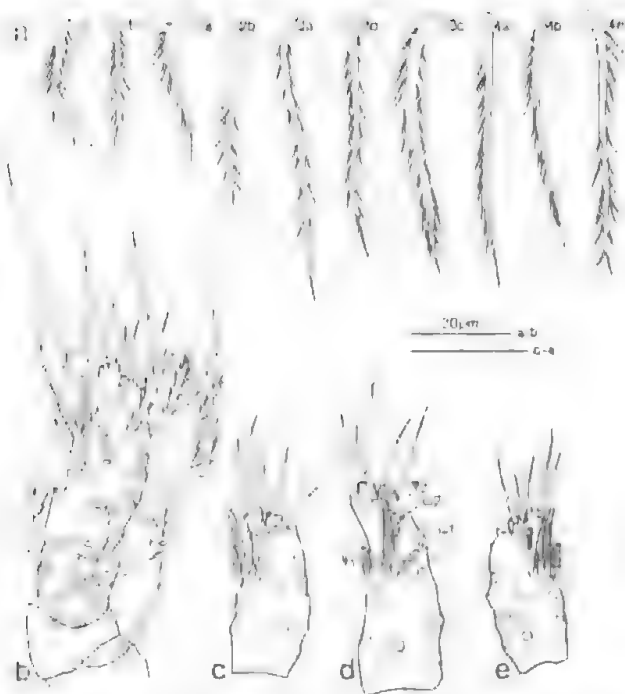


FIGURE 2. *Heterodispus longisetosus*, ♀; a, ventral setae (holotype); b, leg I in ventrolateral view; c-e, tibiotarsus I in different views (only distal setae are drawn).

reductus in the form of setae ps3 as well as in body and leg setae.

Remarks

Although the genus *Heterodispus* has only 26 species, the taxonomic problems are substantial, for the same reasons given by Ebermann (1988) for the genus *Imparipes*. The problem for the student of these species is the difficulty in differentiating new species from known material. The main reason for this is the lack of necessary details in the original descriptions. A first step to improving this situation would be generic revisions and, in some cases, supplementary descriptions of uncertain species are urgently needed. A further problem, which could also affect the genus *Heterodispus*, is that female

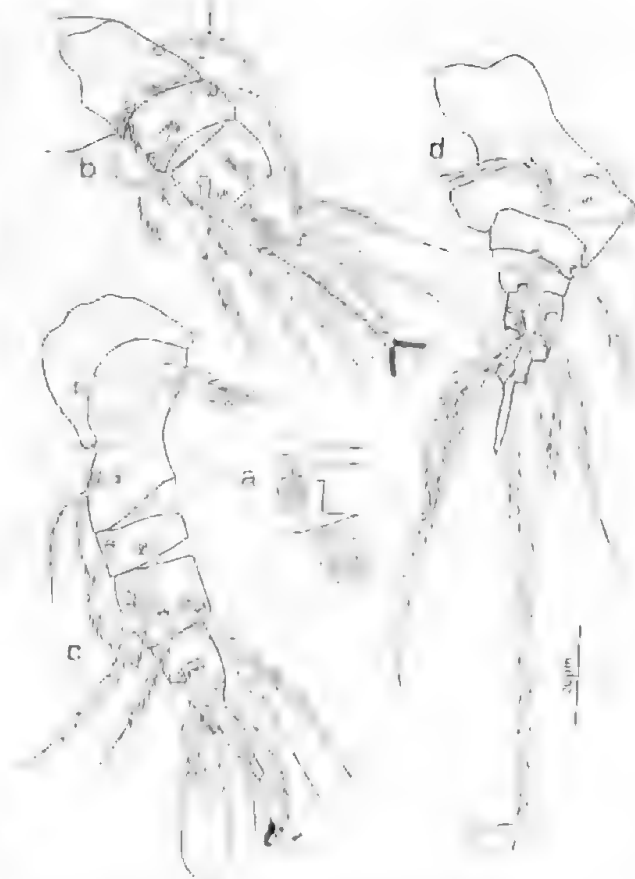


FIGURE 3. *Heterodispus longisetosus*, ♀; a, trichobothrium; b, leg II (ventral); c, leg III (ventrolateral); d, leg IV (ventrolateral). (b, c and d are drawn from various specimens.)

polymorphism occurs in scutacarids, first demonstrated by Norton (1977). New work of mine involving, among other things, the variation in the claws of leg I as well as in the setation of body and legs, has already shown a gradual and varying female dimorphism for various species of several genera (Ebermann in prep.). Female dimorphism in the genus *Heterodispus* has not yet, however, been demonstrated.

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THE MAMMALS OF NORTH-WESTERN SOUTH AUSTRALIA

P. B. COPLEY, C. M. KEMPER & G. C. MEDLIN

Summary

In 1985 a three-week survey was made in parts of north-western South Australia to ascertain which species of mammals occurred in the region in the past and which of these are still present. Trapping and mist-netting yielded four species of small ground mammals and eight species of bats. Another 11 species were observed or their recent signs recorded. *Taphozous hilli* was collected and recorded for the first time in the state. Aboriginal names for mammals were recorded and verified from older published information. The Aboriginal people confirmed that many species no longer inhabited the region. Approximately 23 species of mammals were identified in owl pellets and surface bone deposits. *Pseudantechinus macdonnellensis* was recorded for the first time in South Australia but only in the oldest deposit which contained several species believed to be extinct in the state. The remains of *Mus domesticus* were found in owl pellets and loose material at all four collection sites.

THE MAMMALS OF NORTH-WESTERN SOUTH AUSTRALIA

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Forty-three species of indigenous mammals have now been recorded from the north-west of South Australia but only 20 (46%) of these are considered extant. *Petrogale lateralis* appears to be declining in numbers, with only a few populations remaining. We recommend that these be monitored closely and that steps be taken to protect them.

P.B. Copley, National Parks and Wildlife Service, Department of Environment and Planning, 55 Grenfell Street, Adelaide, South Australia 5000; C.M. Kemper, South Australian Museum, North Terrace, Adelaide, South Australia 5000 and G.C. Medlin, Mawson High School, Colton Avenue, Hove, South Australia 5048. Manuscript received 29 March 1988.

Many arid zone mammal species have undergone drastic changes in distribution and status since European man first settled Australia (Jones 1923-25; Finlayson 1961; Burbidge & Fuller 1979, 1984; Strahan 1983; Burbidge *et al.* 1987; Burbidge *et al.* 1988). The magnitude of this decline will probably not be fully realised until the original faunas become better known through more studies of surface bone deposits and owl pellets. From these sources, Morton & Baynes (1985) have concluded that the extant species, at least among rodents and polyprotodont marsupials, are much reduced in both distribution and abundance when compared with pre-European times.

As early as the mid-1920s, Jones (1923-25) documented the alarming decline of many South Australian species and in 1961 Finlayson concluded that the decline was continuing. At the present time 22 (21%) of the 103 non-marine, native mammal species recorded in South Australia are presumed extinct in the state (Aslin 1985). Much of our knowledge of the mammals of north-western South Australia (and in fact much of central Australia) is due to the work of Finlayson (1935, 1961). He last recorded many of the species now believed extinct in the state in the period from 1931 to 1935.

Other studies before and since Finlayson's time have reported on the mammals of the north-west. These include the Elder Expedition of 1891-1892 (Stirling & Zietz 1892), the Government North-West Expedition of 1903 (Basedow 1915), the White

Expedition of 1914 (White 1915) and the records of Philpott & Smyth (1967).

Finlayson often documented the Aboriginal names for the mammal species he discussed. More recently, Burbidge & Fuller (1979, 1984), Burbidge *et al.* (1987) and Burbidge *et al.* (1988), have sought information on the past and present status of mammals in the desert regions of central Australia in general and Western Australia in particular. Museum skins, to which the Aborigines could immediately relate, consistently elicited the names reported by Finlayson (1961). This survey technique was also adopted by Friend *et al.* (1982) when looking for numbats (*Myrmecobius fasciatus*) and by Southgate (in press) when carrying out research on bilbies (*Macrotis lagotis*).

In September 1985 we visited the Pitjantjatjara lands of north-western South Australia to conduct a rapid survey of the region's mammal fauna. The survey utilised three different methods: 1) collecting skeletal remains from owl roosts and surface bone deposits; 2) observing and/or capturing extant species; and 3) obtaining information from local Aborigines. The results of the survey were then compared with previous records from Australian museums and published literature.

MATERIALS AND METHODS

Figure 1 illustrates the route taken, sites sampled, Aboriginal communities visited and other features

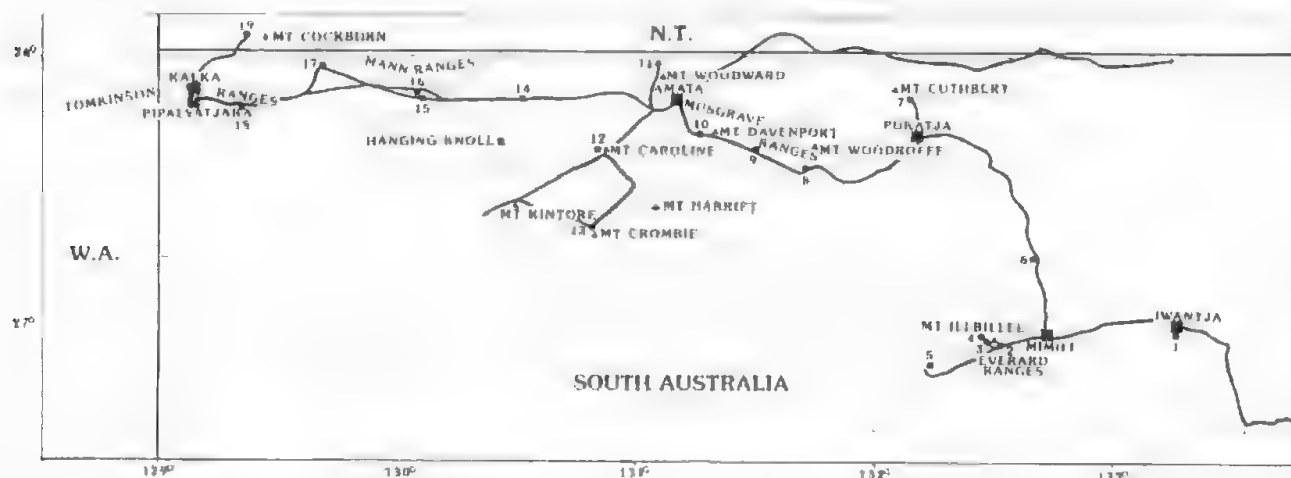


FIGURE 1. Area surveyed for mammals during the September 1985 trip to the north-west of South Australia. -- areas searched for museum records; — route taken; ▲ mountain; ● collection/observation site. Aboriginal communities visited (■) were Mimili (Everard Park), Amata (Musgrave Park), Pipalyatjara (Mt Davies Camp), Iwantja (Indulkana), Pukatja (Ernabella) and Kalka. Numbers are collection/observation sites and refer to localities listed in Table 1.

of interest in the survey area. Table 1 lists and describes the localities where our specimens were collected or where important observations were made.

Museum collections at the Australian Museum (AM), Western Australian Museum (WAM), Central Wildlife Collection of the Northern Territory Museum of Arts and Sciences (NTM) and South Australian Museum (SAM) were searched for

previous mammal records from the area delineated. However, only the most recent specimens are referred to in the 'Results' section.

Owl pellets and surface bone deposits

Skeletal material was collected from five owl roosts at four sites in the study area. Whole or fragmentary pellets were dissected in the manner described by Medlin (1977). Their contents and the

TABLE 1. Localities where mammals or mammal remains were recorded during the 1985 survey. Locality numbers 1-19 are shown on Fig. 1. Aboriginal names refer to general region when applicable.

Site no.	Locality	Lat./long.	Aboriginal name
1.	Warkarrecoordinna Rockhole, S.A.	26°59'S 133°15' E	Warkarrikurti-nya
2.	1 km N Victory Well, S.A.	27°03'S 132°30' E	
3.	3 km SE Betty Well, S.A.	27°03'S 132°27' E	
4.	0.5 km E Betty Well, S.A.	27°02'S 132°26' E	
5.	Eteamerta Hill, S.A.	27°08'S 132°13' E	
6.	25 km N Artoonanna Hill, S.A.	26°44'S 132°38' E	
7.	7 km SE Mt Cuthbert, S.A.	26°07'S 132°06' E	Wamikata
8.	11 km SSW Mt Woodroffe, S.A.	26°24'S 131°42' E	near
9.	18 km SE Mt Davenport, S.A.	26°21'S 131°28' E	Erlywanjawanja
10.	8 km SW Mt Davenport, S.A.	26°17'S 131°15' E	Rockhole
11.	4 km NNW Mt Woodward, S.A.	26°01'S 131°04' E	
12.	2 km E Mt Caroline, S.A.	26°21'S 130°51' E	Ulkiya
13.	3 km NW Mt Crombie, S.A.	26°38'S 130°48' E	Ulpurra
14.	8 km ENE Njungunja Rockhole, S.A.	26°10'S 130°30' E	
15.	4 km W Kapi Kanbina Rockhole, S.A.	26°08'S 130°04' E	Kapi Kanpi
16.	6 km W Kapi Kanbina Rockhole, S.A.	26°08'S 130°03' E	Kapi Kanpi
17.	Katjawara Soak, S.A.	26°02'S 129°40' E	
18.	15 km E Mt Davies Camp, S.A.	26°11'S 129°17' E	
19.	7 km NW Mt Cockburn, N.T.	25°55'S 129°21' E	

loose bones collected from roost floors were identified using museum reference material as well as published descriptions of cranial/dentary measurements and features. Counts of left or right dentaries or maxillae yielded minimum numbers of individuals. No attempt was made to identify hair.

Mammal capture and observation

Small terrestrial mammals were captured in pitfall traps and/or baited, metal box traps (Elliott Scientific Company, 9 x 9 x 30 cm) set at six sites (1, 2, 10, 13, 15/16; Fig. 1). Six nights of box trapping gave 675 trapnights and seven nights of pitfall trapping gave 170 pitnights.

Mist-nets and harp traps were set at nine sites (total of 12 nights) in likely bat flyways i.e. along creek beds, over tanks and dams or around flowering trees. Specimens were collected by hand from caves at three sites (4, 7, 18; Fig. 1).

Animals were killed with nembutal then weighed and measured before tissues (liver, kidney, heart) were removed for later isozyme electrophoresis. Specimens were fixed in 10% formalin and later transferred to 70% ethanol for storage. Identifications were verified by isozyme electrophoresis for the following species: *Taphozous hilli*, *Scotorepens balstoni*, *Eptesicus baverstocki*, *Eptesicus finlaysoni*, *Sminthopsis ooldea*, *Ningaul ridei*, *Pseudomys hermannsburgensis*.

Observations were made of medium to large mammals and their scats and tracks were noted.

Aboriginal knowledge

Interviews were held at six Aboriginal communities (Fig. 1) where the languages used were primarily Pitjantjatjara and Yankunytjatjara, with some Ngaanyatjarra and Ngaatjatjarra. At each community we showed the people museum skins of a range of mammal species, as well as a portion of a stick-nest rat's nest, with a view to learning the local name(s) of each species, its habits and its past and present status in the region. Elder community members usually contributed the most information. These included two men and one woman who acted as guides for parts of the survey.

Orthography of Aboriginal names follows that used by Burbidge *et al.* (1988).

RESULTS

Owl pellets and surface bone deposits

Twenty-three species of mammals were identified from owl pellets and surface bone deposits (Table 2). Of these species, 17 were in loose material only, three were in pellets only and six were in both types of samples. Two species of dasyurid marsupials (*Sminthopsis ooldea* and *Ningaul ridei*) and two

species of rodents (*Mus domesticus* and *Pseudomys cf. hermannsburgensis*) dominated the samples in terms of abundance of individuals and representation at three or four sites. Inverse proportions of *M. domesticus* and *P. cf. hermannsburgensis* were noted at sites 9 and 12. Dasyurids were less numerous than rodents. In addition, at least five species of bats were recorded; however only *Chalinolobus gouldii*, *Eptesicus finlaysoni* and *E. baverstocki* were found in pellets. Those bats occurring in loose material (including a further two species) may not have been the prey of owls.

Owl pellets from sites 6, 9 and 12 were, at the time of collection, intact, black and with the shiny, mucous coat still relatively unchanged. The pellets were found on the surface — not partly buried — and had not been trampled or crushed by animals which had access to the sites. In addition, on return, pellets in sealed plastic bags were found later to contain adults of the clothes moth, *Tineola bisselliella*. These factors together support our view that the pellets were of relatively recent origin i.e. probably deposited within the past 12 months. On this basis, *Pseudomys desertor*, which was present in pellet material at site 12, as well as in loose material at sites 6 and 12, is probably still extant in the region.

Conversely, we believe that the deposit of surface bone material at site 6, north of Artoonanna Hill, is the oldest that we sampled. All material found there was fragmentary and imbedded in sediment. Four extinct species — *Chaeropus ecaudatus*, *Pseudomys gouldii*, *Leporillus apicalis* and *Notomys longicaudatus* — were identified in this material. A further five species were recorded there but not at other sites (see Table 2).

Mus domesticus remains were found at all sites, including site 6. The minimum number of species in loose material was 23, that in pellets was 9. Site 9, near Mt Davenport, was the richest site for bat remains. The 'minimum number of species' has been used in summarising the owl pellet data as skull material referable to *Pseudomys hermannsburgensis* and *Notomys alexis* is often difficult to distinguish from skull characteristics of similar-sized *Pseudomys* or *Notomys* species (e.g. *P. bolami* and *N. fuscus*). In these instances known distributions and captures of live animals close to the sites were taken into account in making the final determination. This also applies to the tentative identification of *Sminthopsis cf. hirtipes*, for which only a single dentary was found.

Captures and observations

Four species of small ground mammals and eight species of bats were captured during the survey. These are detailed in the annotated species list which follows.

TABLE 2. Mammal species recorded in whole or broken owl pellets (right) and loose bone material (left) from owl roosts in north-western South Australia. Values are minimum number of individuals. All samples from site 6 were loose material; all from site 19 were whole pellets. See Table 1 and Fig. 1 for location of sites.

Species	Site no.							
	6	9	12	19				
DASYURIDAE								
<i>Antechinomys laniger</i>	1	0	0	0	0	-	0	
<i>Dasyercus cristicauda</i>	2	0	0	0	0	-	0	
<i>Ningaui ridei</i>	1	1	9	4	9	-	2	
<i>Pseudantechinus macdonnellensis</i>	0	2	0	1	0	-	0	
<i>Sminthopsis cf. hirtipes</i>	0	0	0	1	0	-	0	
<i>S. ooldea</i>	1	10	0	1	0	-	1	
PERAMELIDAE								
<i>Chaeropus ecaudatus</i>	1	0	0	0	0	-	0	
CHIROPTERA Gn. sp.								
<i>Chalinobus</i> sp.	0	3	0	0	0	-	0	
<i>C. gouldii</i>	0	1	0	0	0	-	0	
<i>Eptesicus finlaysoni</i>	0	0	0	0	1	-	0	
<i>E. baverstocki</i>	0	0	1	0	0	-	0	
<i>Mormopterus</i> sp.	0	2	0	0	0	-	0	
<i>Nyctophilus geoffroyi</i>	0	1	0	0	0	-	0	
MURIDAE								
<i>Leggadina forresti</i>	2	0	0	0	0	-	0	
<i>Leporillus apicalis</i>	2	0	0	0	0	-	0	
<i>Mus domesticus</i>	26	1072	204	163	512	-	4	
<i>Notomys</i> sp.	116	0	0	0	0	-	0	
<i>Notomys cf. alexis</i>	0	2	0	0	3	-	0	
<i>N. longicaudatus</i>	7	0	0	0	0	-	0	
<i>Pseudomys desertor</i>	1	0	0	3	9	-	0	
<i>P. gouldii</i>	23	0	0	0	0	-	0	
<i>Pseudomys</i> sp./ <i>Notomys</i> sp.	66	0	0	0	0	-	0	
<i>P. cf. hermannsburgensis</i>	35	123	44	15	239	-	3	
<i>Rattus villosissimus</i>	2	0	0	0	0	-	0	
LEPORIDAE								
<i>Oryctolagus cuniculus</i>	0	2	0	0	0	-	0	
No. of whole pellets	0	48		180			8	
Total no. of individuals	286	1219	259	188	773	-	10	
Min. no. of species/site	14	11	5	7	6	-	4	

Annotated list of mammal species

The following list summarises information obtained from all available sources. It includes the Aboriginal name(s) for each species and, where possible, Aboriginal knowledge about each species' past and present distribution. Species marked with an asterisk were not shown to Aborigines as either museum skins or live-caught individuals. The last known record for each species within the study area — either as a museum specimen or as an observation referred to in the literature — is also given.

MONOTREMATA

Tachyglossidae

**Tachyglossus aculeatus*, short-beaked echidna

Aboriginal names: *tjilkamarta*, *tjirilya*

Last record: 1966 (Philpott & Smyth 1967); this survey (droppings, diggings)

Comments: We found echidna diggings and droppings on nearly every hill we climbed during our travels. However we did not encounter the animal itself. Aborigines from Mimili and Amata used both names but *tjilkamarta* was used elsewhere. A woman from Mimili told us how the

animal was killed and the meat was then removed from the ventral surface.
Regional status: widespread

MARSUPIALIA POLYPROTODONTA

Dasyuridae

**Antechinomys laniger*, kultarr
Aboriginal name: *mingkiri* (see *Sminthopsis* spp.) (Burbidge *et al.* 1988)

Last record: 1933 (SAM); this survey (loose bone material)

Comment: This is another species recorded recently in adjoining areas to the south-east, west and north. It is probably extant in the north-west of the state.

Regional status: indeterminate

Dasyercus cristicauda, mulgara

Aboriginal names: *murtja*, *nyalurti* (Finlayson 1961, Burbidge *et al.* 1988), *mingkiri* (this survey, Burbidge & Fuller 1979, Burbidge *et al.* 1988).

Last record: <1933 (SAM), this survey (loose bone material)

Comments: All people we spoke with used the word *mingkiri* for most small dasyurids and rodents. However, specimens with brush tails were usually given other names as well. Unfortunately, there was no consistency with the use of these other names and we have to rely on Finlayson (1961) and Burbidge *et al.* (1988) as indicators of accuracy.

We were told the name *murtja* at Mimili and Amata in reference to a specimen of *Dasyuroides byrnei* and at Kalka the name *nyalurti* was applied to a specimen of *Pseudantechinus macdonnellensis*. Both names Finlayson (1961) referred to *Dasyercus cristicauda* and this has been supported by the work of Burbidge *et al.* (1988). At Kalka and Pipalyatjara, our specimen of *D. cristicauda* elicited the name *anoola* which Finlayson referred to *Pseudomys (Leggadina) waiti* (= *Leggadina forresti*). Thus it would appear that the names are still known but are now no longer applied accurately, either because the animals no longer exist in the region or because they are no longer hunted and/or encountered by the local people.

Regional status: Although not recorded for the region for more than 50 years, this species has been recorded nearby, to the south-east, west and north in the past 15 years. Most recently it has been captured near Ayers Rock in Uluru National Park (Masters 1989). It is therefore likely that more detailed survey work will find this species within the survey area. Its status is therefore indeterminate.

**Dasyurus geoffroii*, western quoll

Aboriginal name: *parrtjarta*

Last record: <1931 (SAM) (see also Johnson & Roff 1982)

Comments: At Mimili the name was included (unsolicited) in a list of the *kuka* (= meat animals) which an informant's father used to hunt. At Pipalyatjara one old man told us that he used to catch *parrtjarta* by spearing them while they were cornered in a hollow in a tree. Both informants said that this species had been gone for a long time.
Regional status: extinct

Ningau ridel, wongai ningau

Aboriginal name: *mingkiri* (see *Sminthopsis* spp.)

Last record: 1974 (WAM); this survey (captured)

Comments: This species was captured in pitfall traps at sites 2, 13 and 16 (Fig. 1). Single specimens were captured at sites 2 and 16 and five individuals were captured at site 13. They were caught in habitats ranging from tussock and hummock grassland to desert shrubland, on sandy or rubblely-loam soils. *Thiodia* sp. hummocks were present at each site.

Regional status: widespread and probably common

Pseudantechinus macdonnellensis, fat-tailed antechinus

Aboriginal name: *nyalurti*(?) (Burbidge & Fuller 1979)

Last record: this survey (loose bone material)

Comments: This species was first recorded in South Australia from owl pellet deposits at sites 9 and 12 (this study). As it was found only in loose skeletal material (rather than intact pellets) it is likely that these are old specimens. Aborigines at Kalka used the name *nyalurti* for this species and probably confused it with *D. cristicauda*.

Regional status: As this species is common in rocky ranges of adjoining parts of Western Australia and the Northern Territory, further detailed survey work may find it in the survey area. Its status is therefore indeterminate.

Sminthopsis spp., dunnarts

Aboriginal name: *mingkiri* — a generic term for all small dasyurids and mice

**Sminthopsis hirtipes*, hairy-footed dunnart

Last record: this survey (loose bone material)

Comment: No previous record from the region but recorded recently from the Great Victoria Desert to the south and west and Uluru National Park to the north

Regional status: indeterminate, but probably present in sandy habitats across the study area. (The recently described desert dunnart, *S.*

youngsoni, which occurs with *S. hirtipes* in sandy areas of Uluru National Park, may also eventually be found in north-western South Australia).

**Sminthopsis macroura*, stripe-faced dunnart
Last record: <1975 (SAM owl pellet material)
Regional status: indeterminate, but probably locally common in suitable habitats

Sminthopsis ooldea, Ooldea dunnart
Last record: <1975 (SAM owl pellet material); this survey (captured)

Comments: Three individuals were captured in pitfall traps at site 15 (near Kapi Kanpi, Fig. 1). They were trapped in an open woodland of *Hakea ivoryi* and *Acacia estrophiolata* with a grassy understorey of *Aristida* sp. The two males captured both had enlarged prostate glands (evidence of mating condition) and the female showed signs of having mated recently, but had no pouch young. Regional status: probably widespread and common

Myrmecobiidae

Myrmecobius fasciatus, numbat

Aboriginal name: *walpurti*

Last record: <1936 (SAM)

Comment: The numbat is a widely known species in the Pitjantjatjara Lands, mostly through association with dreaming stories, especially in the Everard Ranges. However, with the exception of observations from a few older men, first-hand accounts of this animal were difficult to obtain. One old man at Kalka (about 70 years of age) told us that he knew it from an area south of the Mann Ranges, but had only seen it when he was a boy. Other old men at Mimili could remember the *walpurti* but also only from their childhood. They said that it used to occur around Mintabie and Mimili. All who knew it said that it was good *kuka* (meat).

Friend *et al.* (1982) have summarised the natural history of this species related to them by central Australian Aborigines. In this they concluded that the desert populations of the rusty numbat (*M. fasciatus rufus*) are almost certainly extinct and gave the time of the last Aboriginal sighting as the late 1960s.

Regional status: extinct (see Friend *et al.* 1982)

Notoryctidae

Notoryctes typhlops, marsupial mole

Aboriginal name: *itjaritjari*

Last record: 1986 (SAM)

Comment: Most people recognised this animal immediately and many said that they had seen it recently. All said that it lives in sandhill country. Regional status: Although recorded infrequently,

this species is likely to be widespread in sandy areas of the region.

Peramelidae

**Chaeropus ecaudatus*, pig-footed bandicoot
Aboriginal name: *kanyitjilpa* (Finlayson 1961)

Last record: 1901 (SAM); this survey (loose bone material)

Comment: We did not show a skin of this species, nor did we hear the people using the name — *kanyitjilpa* — that Finlayson (1961) and Burbidge *et al.* (1988) have reported for it. A lower jaw of this species was found in a surface bone deposit in an old owl roost at site 6 during our survey. Regional status: extinct

Isodon auratus, golden bandicoot

Aboriginal names: *wintarru*, *nyurlu*, *makurra*

Last record: 1933 (SAM)

Comment: Many middle-aged and older people at each community readily recognised this species by referring to the coarse texture of its fur and the appearance of its head, feet and tail. It was clearly a former food item and the informants took great delight in demonstrating how they captured it. The bandicoot sheltered in a nest of grass situated between grass tussocks. When this was located the people crept up on it and immobilised the occupant by placing a hand or foot firmly on top of it. All informants stated that this species was now 'finished'. Finlayson (1961) noted that the Pitjantjatjara names for this bandicoot were *wintaroo* (= *wintarru*) and *nyurloo* (= *nyurlu*) and that the Ngaatjatjara from further west call it *makoora* (= *makurra*). We were given the first two names only at Ernabella, and the latter name only at Kalka. Elsewhere, all three names were provided. Regional status: extinct

Macrotis lagotis, greater bilby

Aboriginal names: *tjarlku*, *nirru*, *marrura*

Last record: 1933 (SAM)

Comment: This species was well known to all groups with whom we spoke. The name *tjarlku* was used at Indulkana, Mimili and Amata; *nirru* at Mimili, Ernabella, Amata, Pipalyatjara and Kalka; and *marrura* at Ernabella. At Pipalyatjara one old man told us that *nirru* tails used to be worn ceremonially in men's beards. None of our informants knew of any extant populations in South Australia. The nearest they knew of (at Pipalyatjara and Kalka) was in the Kintore Ranges in the Northern Territory (ca 300 km to the north). Regional status: probably extinct

**Perameles eremiana*, desert bandicoot

Last record: <1936 (SAM)

Perameles bougainville, western barred bandicoot
Last record: 1931 (SAM)

Aboriginal name: *walilya*

Comment: The South Australian Museum has three specimens of *Perameles bougainville* from 'south of Mt Crombie' registered in 1931. Mt Crombie is situated 'south of the Musgrave and Mann Range', a location Finlayson (1961) cited for *P. eremiana*, not *P. bougainville*. At Pipalyatjara and Kalka, our specimen of *P. bougainville* was readily recognised by the name *walilya*. However, at other communities the responses of our informants were mostly indecisive and confused. Some said that it was a small *wintarru* or *nyurlu* (i.e. *I. auratus*). Others simply did not know it. Regional status: extinct (both species)

DIPROTODONTA

Phalangeridae

Trichosurus vulpecula, common brushtail possum

Aboriginal names: *wayurta*, *mungawayurru*

Last record: 1966 (SAM, mummified remains); this survey (old seats)

Comments: Most older people recognised this species and claimed that it used to be common. No-one knew of its existence in this part of South Australia, and most thought that it was 'finished' many years ago. However, some people at Kalka and Pipalyatjara thought they still occurred in the gum-lined creeks in the Petermann Ranges in the south-west of the Northern Territory. The only signs of possums we found were old droppings which were in caves where they had been protected from weathering. These were found near Betty Well in the Everard Ranges, and on Mt Kintore, about 80 km south-west of Amata. Aitken (unpublished notes, 1966) also found droppings and skeletal remains 'at a small cave opposite Kumbi Rock Hole . . . approximately 4 miles south of the main road' (presumably near Piltardi at the eastern end of the Mann Ranges).

Several common brushtail possums were released near Ernabella in the early 1970s (R. Henderson, S.A. National Parks and Wildlife Service, pers. comm.). Unfortunately, they have not been recorded in the area since and are considered by many to be extinct. However, they are known to occur in very low densities in a small area of the Petermann Ranges, only 100 km north of the South Australian/Northern Territory border and detailed surveys may locate them again south of the border.

Regional status: apparently extinct but more intensive surveys needed (see Foulkes & Kerle 1989)

Potoroidae

Bettongia lesueur, burrowing bettong

Aboriginal name: *mitika*, *tungku*

Last record: <1931 (SAM)

Comment: A few older men at Indulkana and Minili recognised this species and each used both names. They stated that it had not been seen for a long time. It was unclear as to whether the word *tungku* (which means short and stumpy) was their name for it or simply a description of the animal. Regional status: extinct (see Burbidge *et al.* 1988)

**Bettongia penicillata*, brush-tailed bettong

Aboriginal name: *karrpitji* (Finlayson 1961, Burbidge *et al.* 1988)

Last record: ?1930s (Finlayson 1961)

Comments: We did not obtain information about this species. However, Finlayson (1961: 169) recorded that this bettong was, 'still extant in very small numbers on both sides of the South Australian (Northern Territory) border in 1932-35, where specimens were obtained by the blacks'. Regional status: extinct (see Burbidge *et al.* 1988)

Macropodidae

**Lagorchestes hirsutus*, rufous hare-wallaby

Aboriginal name: *mala*

Last record: 1933 (SAM)

Comment: Many of the middle-aged and especially older people we spoke with pointed out that hare-wallabies used to occur in spinifex country in the region and that they were good meat. However, none of them knew of any remnant populations. Aitken noted in 1966 (unpublished journal) that they were 'now extinct, apparently'.

Regional status: extinct [Burbidge *et al.* (1988) give the most recent Aboriginal sighting of this species in the region as 30 years ago near Amata.]

**Macropus robustus*, euro

Aboriginal name: *kanyala*

Last record: this survey (sighted)

Comment: The euro is widespread and common in all rocky country. It is hunted by the local people, but red kangaroos and perenties (*Varanus giganteus*) appear to be favoured.

Regional status: widespread and common

Macropus rufus, red kangaroo

Aboriginal name: *marlu*

Last record: ?this survey (specimen and sighted)

Comment: Red kangaroos are fairly common in mulga country, especially where ground cover is tussock grass rather than spinifex. They are keenly hunted by the local people using rifles. As a consequence they were uncommon around settlements and were nowhere abundant in areas we traversed. We collected one specimen, a pouch young (M12724), 15 km NNE of Mt Crombie. Regional status: widespread at low densities

**Onychogalea lunata*, crescent nail-tailed wallaby
 Aboriginal name: *tjawalpa*

Last record: 1891 (SAM)

Comment: Aboriginal people at Indulkana and Mimili used this species' name and claimed to have eaten it when they were younger. All stated that it was no longer around. Aitken noted in his journal records during a trip to the region in February 1966 (unpublished):

One of the main reasons for going to Itari [near Dry Hill, and about 40 km east of Mt Lindsay] was to check on the reports of a wallaby still living in the area. These may quite well still be there but we were not in fact to locate them . . . the wallaby from description is obviously *Onychogalea lunata* the Crescent Nail-tail [sic], which in this country lives by burrowing under a shady shrub or tree during the day and partially covering itself with sand and debris. It ventures forth at night to feed . . . [Here] the vegetation was predominantly mulga with patches of sparse mallee. The undergrowth was of spinifex, native grasses, bunyeroo [sic], three-cornered jack and bindyi.

Regional status: extinct

Petrogale lateralis, black-footed rock-wallaby

Aboriginal name: *warru*

Last record: 1966 (Philpott & Smyth 1967); this survey (sighted)

Comment: We observed three black-footed rock-wallabies in the vicinity of a large cave at Wamikata (site 7, Fig. 1) in the Musgrave Ranges. The entrance to the cave was mostly blocked by fallen boulders behind which were two large chambers. Rock-wallaby faecal pellets littered the floors of both of these. We collected skeletal remains of one wallaby (M12555) in the cave.

We also found fresh rock-wallaby faecal pellets at one site (5) in the Everard Ranges and two sites (14, 17) in the Mann Ranges. We found old rock-wallaby faecal pellets in caves near:

- 1) Warkarrecoordinna Rockhole (site 1)
- 2) near Betty Well (sites 3, 4)
- 3) Mt Kintore (26° 34'S, 130° 30'E)
- 4) Mt Caroline (26° 21'S, 130° 51'E) and
- 5) un-named hill (26° 08'S, 130° 00'E) about 10 km west of Kapi Kanpi Rockhole.

Local people told us that rock-wallabies also still occur at:

- 1) an un-named hill near New Well (approx. 26° 07'S, 132° 12'E) about 8 km east of the Wamikata site
- 2) an un-named hill on the eastern side of the Ernabella airstrip (approx. 26° 16'S, 132° 11'E)
- 3) Mt Harriet (26° 32'S, 131° 05'E) about 45 km south of Amata

4) some un-named hills (26° 24'S, 130° 50'E) about 8 km south of Mt Caroline; and

5) an unspecified area north-west of Angatja homeland and probably to the NNE of Mt Winham (approx. 26° 02'S, 130° 16'E).

Unfortunately, we were unable to include these in our itinerary.

Aboriginal informants told us that when they were children, rock-wallabies used to be more widespread and abundant and that they frequently killed them for food. One man from Amata showed us how he used to sit in a strategic place amongst some rocks and whistle quietly to lure the inquisitive rock-wallabies out of their hiding place so that he could spear them. Their numbers have apparently declined dramatically and we were told of numerous places from which they have disappeared.

Regional status: declining populations; probably endangered by predation, especially by the introduced fox (see Kinnear 1989)

EUTHERIA

CHIROPTERA

Aboriginal names: Aboriginal people we spoke with constantly used one word — *pitjantjaru* — to describe all bats. However, they distinguished cave-dwelling bats with the additional name — *patupiri*. At Kalka, the name *ulpurulpuri* [also recorded by Finlayson (1961) as *oolpoolparrie*] was also given for a special cave-dwelling 'bat' which roosted in a small mud nest. The nests, which were shown to us, were those of fairy martins, but it was not possible to ascertain whether the name actually refers to the bird, or to a small bat which used deserted nests. Goddard (1986) concluded that the name *patupiri* also applied to fairy martins. The name is therefore probably used in a general way by many people to refer to cave-dwelling fauna. Another name, *tjinytjinytji*, has been recorded by Burbidge & Fuller (1979) and Burbidge *et al.* (1988) as a general word for bats but we were told that it referred to an insect (probably a cricket). The name may therefore also be used in a general way to mimic the high-pitched noises of both bats and crickets.

Megadermatidae

Macroderma gigas, ghost bat

Aboriginal name: *tjalku-tjalku* (Burbidge *et al.* 1988) — the only bat of the region with a unique name

Last record: ca 1920 (Finlayson 1961)

Comment: This most distinctive bat was recognised by the Aborigines with its own name. Older men at Amata told us of two localities for large, white bats (*Macroderma gigas*?) but we

could not determine whether the animals still occurred there. The localities were Aparina Creek (=Apari-nya Karu, J. Willis pers. comm.), near site 11 (Fig. 1, Table 1) and Cave Hill (26° 92' S, 131° 21' E) about 24 km NE of Amata.

Regional status: probably extinct (see Burbidge *et al.* 1988)

Emballonuridae

Tuphozous hilli, Hill's sheath-tail-bat

Last record: this survey (captured)

Comment: This species was first recorded for South Australia during the 1985 survey. It was found in two cave roosts, one at site 4 in the Everard Ranges, the other at site 7 in the Musgrave Ranges (see Fig. 1). At both roosts, the bats were located in narrow crevices off the main chambers. Two specimens were collected at site 4, and three (of five captured) at site 7.

Regional status: probably locally common

Molossidae

**Mormopterus planiceps*, little mastiff-bat

Last record: this survey (loose bone material)

Comment: Two skulls of this small bat were recorded in loose bone material from an owl roost at site 9 on the south side of the Musgrave Ranges (see Fig. 1) during this survey. This species is very adaptable in its feeding and roosting habits (Richards, in Strahan 1983) and is probably widespread in the region.

Regional status: probably widespread and common

**Tadarida australis*, white-striped mastiff-bat

Last record: <1961 (AM); this survey (captured)

Comment: This high-flying bat was only captured over water at site 8, on the south side of the Musgrave Ranges, where 10 individuals were mist-netted (four retained).

Regional status: probably widespread and common

Vespertilionidae

**Chalinolobus gouldii*, Gould's wattled bat

Last record: 1963 (SAM); this survey (captured and owl pellets)

Comment: This common species was mist-netted at sites 1 (five captured, two retained), 2 (six captured, two retained), 8 (five captured, three retained) and 11 (one captured and retained) during the survey. All captures were made either over or adjacent to waterholes in gum-lined creeks of the Everard and Musgrave Ranges. Two of the females captured each had two small embryos.

Regional status: probably widespread and common

**Chalinolobus morio*, chocolate wattled bat

Last record: this survey (captured)

Comment: Before this survey, this common southern species was only known in central Australia from a cave-dwelling population near Alice Springs. However, it was mist-netted at five sites during the survey — the four where *C. gouldii* was captured, plus site 15, a waterhole-creekline habitat in the Mann Ranges. Several of the females captured were pregnant with either one or two embryos. One specimen was captured and retained at site 1, 20 (two retained) at site 2, three at both sites 8 and 11 (all retained), and one (released) at site 15.

Regional status: probably widespread and common

**Eptesicus baverstocki*, inland eptesicus

Last record: this survey (captured and owl pellets)

Comment: A single specimen of this newly described species was captured (and retained) during the survey. It was mist-netted over water at site 1, south of Indulkana.

Regional status: indeterminate, probably widespread

**Eptesicus finlaysoni*, little brown bat

Last record: 1984 (SAM); this survey (captured and owl pellets)

Comment: This newly described species was mist-netted over water at sites 2 (two specimens, both retained) and 8 (one specimen, retained) and captured in cave roosts at sites 7 (18, four retained) and 18 (one, retained) (Fig. 1).

Regional status: probably widespread and common in the vicinity of range country

Nyctophilus geoffroyi, lesser long-eared bat

Last record: <1961 (AM); this survey (captured and loose bone material)

Comment: This common species was captured at seven of the ten sites where bats were caught during the survey. Most of the females captured were found to be pregnant with two embryos. Nine specimens were captured at site 1 (three retained), one (retained) at site 2, two (retained) at site 8, one at both sites 11 and 12 (retained), and five at both sites 13 and 15 (all retained).

Regional status: widespread and common

**Scotorepens balstoni*, western broad-nosed bat

Last record: this survey (captured)

Comment: A single specimen of this species was captured (and retained) in a mist-net at site 11 (Fig. 1).

Regional status: indeterminate, probably widespread

**Scotorepens greyi*, little broad-nosed bat

Last record: 1966 (SAM)

Comment: Probably occurs throughout the range country.

Regional status: indeterminate, probably widespread

RODENTIA

Muridae

**Leggadina forresti*, Forrest's mouse

Aboriginal name: *mingkiri*

Last record: 1975 (SAM, owl pellet material); this survey (loose bone material)

Comment: Since a recent (1984) specimen was collected on Granite Downs station just outside the study area to the east, it is quite likely that this rare species is extant in the north-west.

Regional status: indeterminate

Leporillus apicalis, lesser stick-nest rat

(*Leporillus conditor*, greater stick-nest rat?)

Aboriginal name: *tjuyalpi*

Last record: 1933 (SAM); this survey (loose bone material)

Comment: Although both species of stick-nest rat (*Leporillus apicalis* and *L. conditor*) have been recorded from semi-arid and arid areas of South Australia, only *L. apicalis* has been collected in the north-west of the state. This was by anthropologist Norman Tindale and physician C.J. Hackett in 1933. Tindale (pers. comm.) states that:

On 18 July 1933 while travelling with a clan-like group of Pitjandjatyara [sic] eastward from Wiluwilura, a native watering place and camp west of Mount Crombie on the south side of the Musgrave Ranges, we passed from a porcupine grassed plain with low undergrowth between widely spaced clumps of the grass into low mallee scrub country with some outcrops of kunkar limestone and a scattering of kurrajong trees. Almost immediately we saw the first of several twig mounds of a house-building rat. It was sheltered under a kurrajong tree and was some 5 feet [1.5 m] in diameter and 4 feet [1.2 m] high. The aborigines who were independent, since we were observers only, set fire to it but the inhabitants had already left. We saw several more of these nests within the next half mile or so [1 km] one of which was under a spreading mallee. All were set on fire. Fires drove out several of the 'tjuijalbi' [sic] from their 'ngura tjuijalbi' [sic] and [these were] seized by the dogs of the hunters. Two of the animals were secured by us for the South Australian Museum collection.

Part of this sequence of events was recorded on film ('Mann Ranges — 1933'), copies of which are held by the Board for Anthropological Research, University of Adelaide.

Few people at the communities we visited showed any signs of recognition of the stick-nest rat specimen (of the similar *L. conditor*) we had with us. However, more people responded to questions about the origins of portions of a stick-nest we showed them. They used the name *tjuyalpi* for the animals which built the nests which they said had a burrow beneath the pile of sticks. Opinion was divided as to whether the nests were built in caves or in the open, but one old man at Kalka told us that they were built in either situation. If they were out in the open the nests were placed amongst a lot of vegetation (e.g. around a bush), but not amongst spinifex clumps. The same informant told us that the nests contained an adult male and an adult female and up to four young. The nests measured about 1 m by 0.5 m, which he traced in the sand to demonstrate. Some old people had seen stick-nest rats when they were young, mostly about 45 to 50 years ago. All said that they ate the rats and that they were 'good meat'.

We searched for stick-nests in the numerous caves and rock overhangs we explored, but only found three small, burnt remnants — two near Betty Well (sites 3, 4) in the Everard Ranges and one in the north-western Mann Ranges (19). During our survey we also collected skeletal remains of two *L. apicalis* from an old owl roost at site 6. However, we found no signs of stick-nest rats or their nests in the country which Tindale (pers. comm.) described west of Mt Crombie. Regional status: extinct

Mus domesticus, house mouse

Aboriginal name: *mingkiri*

Last record: 1972 (SAM); this survey (captured and owl pellets)

Comment: Finlayson (1961) noted that there were considerable numbers of house mice in the study area in 1932–35. During our survey they were only captured in close proximity to human settlements at sites 2 and 10 (Fig. 1). However, large proportions of this species were also recorded in old and recent owl pellet deposits at sites 6, 9, 12 and 19 (Table 2).

Regional status: widespread and locally common

Notomys alexis, spinifex hopping-mouse

Aboriginal name: *tarrkawara*, *mingkiri*

Last record: 1966 (SAM); this survey (owl pellets)

Comment: This species is well-known by the majority of Aboriginal people we talked with. However, many confused it with other specimens we had with us which had brush tails (e.g. *Dasycercus cristicauda*, *Dasyuroides byrnei*).

Notomys sp. tracks were pointed out to us on sandhill areas, on the north side of Mt Crombie and on the Northern Territory-South Australian border north of Kalka. We also collected many skeletal remains of *Notomys* cf. *alexis* and *Notomys* sp. in owl pellet deposits at sites 6, 9, and 12 — those at site 12 occurring in intact 'recent' pellets.

Regional status: widespread and common

Notomys longicaudatus, long-tailed hopping-mouse
Aboriginal name: ?

Last record: this survey (loose surface bone material)

Comment: Not previously recorded from north-western South Australia. Skull fragments of at least seven individuals were found in an old owl roost at site 6 just north of the Everard Ranges.

Regional status: extinct

**Pseudomys desertor*, desert mouse

Aboriginal name: *mingkiri*

Last record: 1933 (SAM); <1961 (AM); this survey (owl pellets)

Comment: This little-known mouse has recently been captured (1987 and 1988) at two sites in Uluru National Park (Kerle & Morton 1988). Along with the 'recent' remains found in intact owl pellets at site 12, it seems likely that this species may still occur in suitable habitats within the survey area. Kerle & Morton (1988) suggest that these suitable habitats include areas of dense grass.

Regional status: indeterminate, probably still extant

**Pseudomys gouldii*, Gould's mouse

Aboriginal name: *mingkiri*

Last record: this survey (loose bone material)

Comment: This small mouse had not previously been recorded from north-western South Australia. In this survey, we found the skeletal remains of 23 individuals in an old surface bone deposit at site 6, just north of the Everard Ranges.

Regional status: extinct

Pseudomys hermannsburgensis, sandy inland mouse

Aboriginal name: *mingkiri*

Last record: 1972 (SAM); this survey (captured)

Comment: Single specimens of this mouse were captured in pitfall traps at sites 2, 13 and 15 (Fig. 1). The first two specimens were caught in hummock grasslands on sandy soils. The last was caught in an open woodland habitat of *Hakea ivoryl* and *Acacia estrophiolata* with an understorey of *Aristida* tussock grasses. Numerous skeletal remains were also found at sites 6, 9, 12 and 19, with many of those at sites 9, 12 and 19

coming from recent intact owl pellets (Table 2).
Regional status: widespread and common

**Rattus villosissimus*, long-haired rat

Aboriginal name: ? *mingkiri*

Last record: 1975 (SAM, owl pellet material); this survey (loose bone material)

Comment: This species has probably only invaded this region in extreme plaguing situations (see Redhead 1983). The owl pellet material it has been found in does not appear to be of recent origin — skull fragments of only two individuals having been found at site 6 during this survey.

Regional status: extinct

LAGOMORPHA

Leporidae

**Oryctolagus cuniculus*, European rabbit

Aboriginal names: *rapita*, *nani*

Last record: this survey (sighted and loose bone material)

Comment: The European rabbit is common in the north-west of South Australia; however, its numbers appear to be concentrated along drainage lines and on stony alluvial plains fringing the ranges and outlying hills. In 1985, few signs of rabbits were seen more than 5 km from the ranges and they appeared to be absent from sandhill areas. They are a major food source for Aborigines. Maurice & Murray (in Finlayson 1961) recorded rabbits as already plentiful in the Musgrave Ranges in 1901.

Regional status: widespread and common especially in drainage areas

CARNIVORA

Canidae

**Canis familiaris dingo*, dingo

Aboriginal name: *papa*

Last record: 1957 (SAM); this survey (sighted)

Comment: Dingoes are another widespread and common species in the region. Tracks were seen in most areas visited and individuals or pairs were observed on many occasions, mostly in open country near the ranges where rabbits were most abundant.

Regional status: widespread, in low densities

**Vulpes vulpes*, fox

Aboriginal name: ?, 'torka' according to Finlayson (1961)

Last record: this survey (sighted)

Comment: Finlayson (1961) observed that during his field work of 1932, foxes were found to be well known to natives and white doggers in the Everard and Musgrave Ranges, though still in quite small

numbers'. By the 1950s their numbers had increased significantly to the point where 'native hunters interrogated in 1956, stated that in the area immediately to the south of the Musgrave, Mann and Tomkinson Ranges (which yields most of their dog scalps), the fox now out numbers the dingo'. Regional status: widespread, probably in low densities

Felidae

**Felis colus*, cat

Aboriginal name: ?

Last record: this survey (sighted)

Comment: Only one cat was seen during our survey, near Kapi Kanpi (site 15). However, local Aborigines claimed that they were seen frequently. Regional status: widespread, probably in low densities

PERISSODACTYLA

Equidae

Equus caballus, wild horse (brumby)

Aboriginal name: ?

Last record: this survey (sighted)

Comment: Wild horses were seen only on the south side of the Musgrave Ranges where they were concentrated around the few remaining waterholes. Regional status: locally common

ARTIODACTYLA

Camelidae

Camelus dromedarius, one-humped camel or dromedary

Aboriginal name: *camela*

Last record: this survey (sighted)

Comment: Camels are widespread in the north-west of South Australia and we encountered their distinctive pads and droppings in all areas we visited. We made several sightings of small groups of camels including cows with young calves. The largest group consisted of 12 individuals.

Regional status: widespread

DISCUSSION

The Pitjantjatjara lands of north-western South Australia offer a unique opportunity to study and compare recent past and present mammal assemblages for the following reasons: (1) the environment is a combination of two vastly different forms — sand plain/dune systems and rocky ranges; (2) the ranges provide good shelter for owls and thus surface bone deposits are probably common; (3) many species now believed extinct in South Australia were last recorded there; (4) there is good documentation of the timing of these declines (Finlayson 1961); and (5) the lands are now under control of the Pitjantjatjara

Aboriginal people and have mostly not been grazed by domestic stock for many years — if at all.

The present survey recorded 16 indigenous mammal species by observation or capture. Another nine species probably still occur in the region. A compilation of all known records for the north-west gives a total mammal species list of 50, seven of which are not indigenous to Australia. Compared with other regions of arid Australia for which lists have been made, this figure is high. McKenzie & Robinson (1987) listed 41 and 37 species, including introduced forms, for the Nullarbor Plain and Great Victoria Desert, respectively. Burbidge & McKenzie (1983) reported 42 species in the Great Sandy Desert. Sixteen species were listed during a recent survey of the Mabel Creek area of South Australia (Kemper *et al.* 1985).

Reasons for the richness of the mammal fauna of north-west South Australia are related to points 1–5 listed above. Since there are two quite different environments, sand plain/dune and rocky ranges, there are elements of the faunas adapted to both. For example, *Petrogale lateralis* and *Pseudantechinus mucedonellensis* are inhabitants of rocky outcrops, and *Chalinolobus morio*, *Eptesicus finlaysoni* and *Taphozous hilli* are cave-dwelling bats. On the other hand, *Notoryctes typhlops*, *Dasyercus cristicauda* and *Sminthopsis ooldea*, among others, live in sandy country.

The early work of Finlayson (1961, museum collections) documented many mammal species which now no longer occur in South Australia. Fortunately, his work coincided with their population declines in the 1920s and 1930s. Finlayson often used Aboriginal knowledge of the species to augment his own findings and he also obtained many specimens from these people (but only two species of bats). The present survey focused on collecting bats with the result that this part of the fauna is now reasonably well known.

The present survey included two sources of information not normally used in mammal survey — Aboriginal knowledge and surface bone deposits/owl pellets. The latter was particularly important because it added several species not recorded by other means and one species, *Pseudantechinus mucedonellensis*, not previously recorded in South Australia. The problem with surface remains and very old pellets is that it is difficult to date such deposits. It is presumed that if *Mus domesticus* is present then the material has been deposited since European settlement i.e. during the last 200 years. For example, Johnson & Baynes (1982) found a good correlation between species compositions in surface deposits and early whole-specimen collections from the same area.

As a result of our investigations and others (Jones 1923–25, Finlayson 1961, Philpott & Smyth 1967,

Watts 1969, Burbidge & Fuller 1979, Friend *et al.* 1982, Southgate in press, Burbidge *et al.* 1987, Burbidge *et al.* 1988) we conclude that only 20 (46%) of the 43 indigenous mammal species still occur in the north-west of South Australia. These are generally the small- (<40 g) and large-sized (>7.5 kg) species; a trend in keeping with results obtained in the arid zone in general (Morton & Baynes 1985, Burbidge & McKenzie 1987).

Morton & Baynes (1985) compared mammal assemblages of surface bone deposits with extant species in the western arid zone. They concluded that only 41% and 44% of the original polyprotodont marsupial and rodent faunas, respectively, remained today. Comparable figures of about 43% and 38% were obtained for the present study. Watts & Aslin (1981) compared recently (*i.e.* not fossil) extinct rodent species with those still extant and concluded that 25-60% remained.

More survey work is clearly needed to determine the distribution and status of extant species in the Pitjantjatjara lands. Particular emphasis should be placed on rare species such as the black-footed rock-wallaby *Petrogale lateralis*, the desert mouse *Pseudomys desertor*, and possibly the kultarr

Antechinomys laniger and mulgara *Dasyercus cristicauda*. A comprehensive vegetation survey would aid in understanding the biology and distribution of extant forms as would a report on the status of non-indigenous species. We recommend that further survey work be of a multi-disciplinary nature and that predator scats and stomachs be investigated as a possible means of recording rare species.

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REVISION OF AUSTRALASIAN STERNOLOPHUS SOLIER (COLEOPTERA: HYDROPHILIDAE)

C. H. S. WATTS

Summary

The Australasian members of the hydrophilid genus *Sternolophus* Solier are revised and redescribed and a key to species is given. Three species are recognised: *S. australis* sp. nov., *S. immarginatus* d'Orchymont and *S. marginicollis* (Hope). The following names are synonymised with *S. marginicollis* (Hope, 1842): *Hydrobius artensis* Montrouzier, 1860 and *Sternolophus tenebricosus* Blackburn, 1888.

REVISION OF AUSTRALASIAN *STERNOLOPHUS* SOLIER (COLEOPTERA: HYDROPHILIDAE)

C. H. S. WATTS

WATTS, C.H.S. 1989. Revision of Australasian *Sternolophus* Solier (Coleoptera: Hydrophilidae). *Rec. S. Aust. Mus.*, 23(2): 89-95.

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The following names are synonymised with *S. marginicollis* (Hope, 1842): *Hydrobius artensis* Montrouzier, 1860 and *Sternolophus tenebricosus* Blackburn., 1888.

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Among the most common of Australasian hydrophilids, especially in the warmer regions, are members of the genus *Sternolophus* Solier. At times in drying river bed pools it is possible to collect hundreds of individuals in a short time. Despite their abundance they have received little attention since d'Orchymont (1912).

Five Australian forms have been named. Of these I consider only two to represent valid species: *S. marginicollis* (Hope, 1842), and *S. immarginatus* d'Orchymont, 1912. I describe a further one, *S. australis* sp. nov. All occur broadly sympatrically across northern and inland Australia. They appear to be absent from the wetter coastal fringes of the south-west and the south-east and from Tasmania. *S. marginicollis* also occurs in New Guinea and New Caledonia. The genus itself consists of about a dozen species found in Africa, tropical Asia and Australasia.

I do not recognise the subgenus (or genus) *Neosternolophus* Zaitzev, 1909 used for the Australian and some African species (Krišch 1924, Smetana 1980), since I have found the main distinction, the extent of emargination of the clypeus, to vary even within species. A full study of all the species in the genus is required before the validity of the generic separation is established.

SYSTEMATICS

The genus *Sternolophus* belongs to the subfamily Hydrophilinae, characterised by a continuous median longitudinal keel on the underside which is prolonged into a spine between the hind coxae. Within the Australasian members of this subfamily, *Sternolophus* is characterised by having the front of the ventral keel notched, the prosternal pillar not hooded to receive the front end of the ventral keel, the basal portions of all femora densely punctate-pubescent, and only four rows of serial punctures

on each elytron *i.e.* lacking the fifth sublateral row of punctures present in most species of other genera. In most species the front margin of the clypeus has a central notch (Fig. 2).

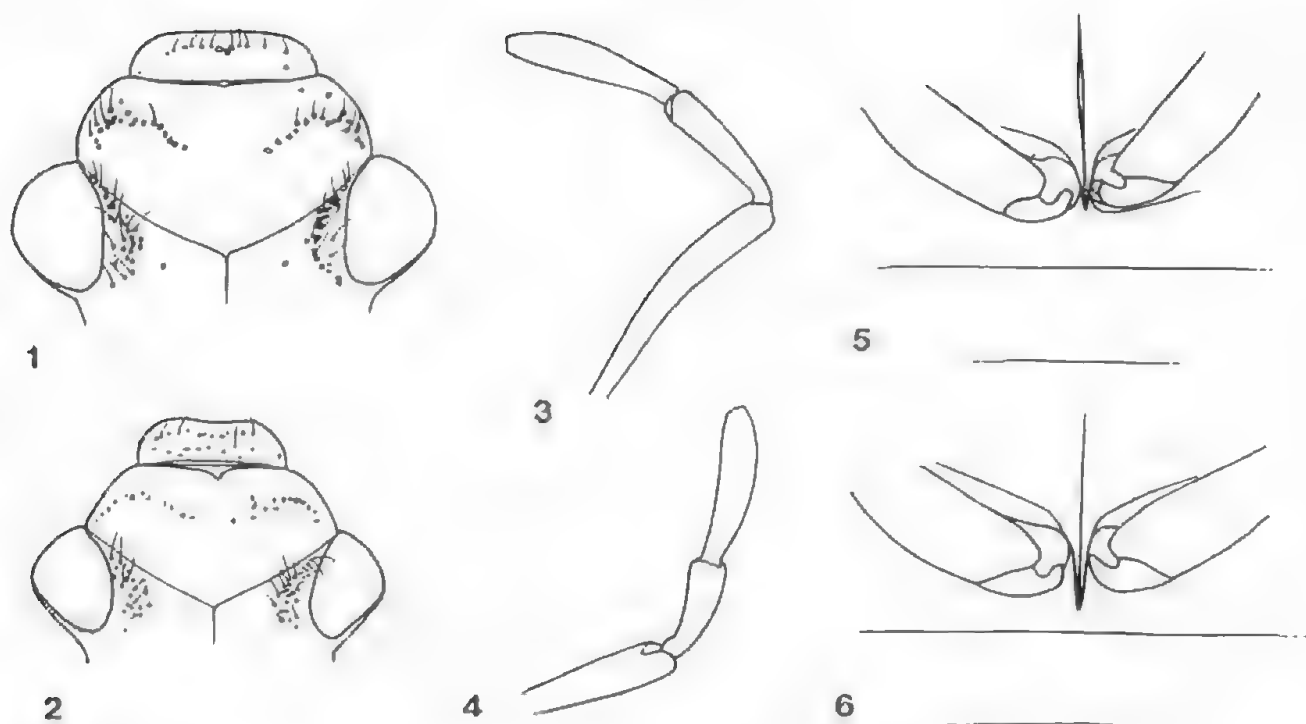
Type species as follows: *Sternolophus*: *S. solieri* Castelnau, 1840, 'Africa', *Neosternolophus*: *Hydrobius artensis* Montrouzier, 1860, Australia.

The collections from which specimens were examined are listed under the following abbreviations:

AM	Australian Museum, Sydney
ANIC	Australian National Insect Collection, Canberra
BMNH	British Museum (Natural History), London
CW	Private collection of author
RIB	Institut Royal des Sciences Naturelles de Belgique, Bruxelles
NMV	Museum of Victoria, Melbourne
NSWDA	New South Wales Department of Agriculture, Sydney
NTM	Museum and Art Galleries of the Northern Territory, Darwin
MNHP	Museum National d'Histoire Naturelle, Paris
SAMA	South Australian Museum, Adelaide
WAM	Western Australian Museum, Perth
QDFIM	Queensland Department of Primary Industries, Mareeba
QM	Queensland Museum, Brisbane.

KEY TO AUSTRALASIAN *STERNOLOPHUS*

- 1 — Sternal spine long, reaching to front edge of third abdominal sternite.....
.....*rufipes* Fabricius*
- Sternal spine not reaching beyond first abdominal sternite.....2



FIGURES 1-6. 1, front of head of *S. australis*; 2, ditto, *S. marginicollis*; 3, labial palpus of *S. marginicollis*; 4, ditto, *S. australis*; 5, apex of sternal spine in *S. immarginatus*; 6, ditto, *S. marginicollis*.

2(1) — Maxillary palpi stout, same length as antennae, second segment noticeably shorter than apical (Fig. 4); row of punctures on outer face of protibia 9-10, largest at apex. *australis* sp. nov.

— Maxillary palpi elongate, longer than antennae, second segment almost as long as apical (Fig. 3); more than 15 punctures in a row on outer face of protibia, largest towards base. 3

3(2) — Last abdominal sternite entire; sternal spine short, not reaching beyond metatrochanters (Fig. 5). *immarginatus* d'Orchymont

— Last abdominal sternite notched at apex; sternal spine reaching to about middle of first abdominal sternite or beyond (Fig. 6) *marginicollis* (Hope)

*Not yet recorded from region but reaches Java.

Sternolophus australis sp. nov.

Description (number examined 82) (Figs 1, 4)

Length 11.5-14.5 mm. Oval, black. Head covered in small unevenly sized punctures evenly spread, stronger and denser along rear margin, a group of much larger punctures just inwards from eyes, and a semicircle of large punctures on frons forward from eyes, a few large punctures in line in middle of clypeus. Front margin of frons entire or only very weakly emarginate in centre. Pronotum covered in

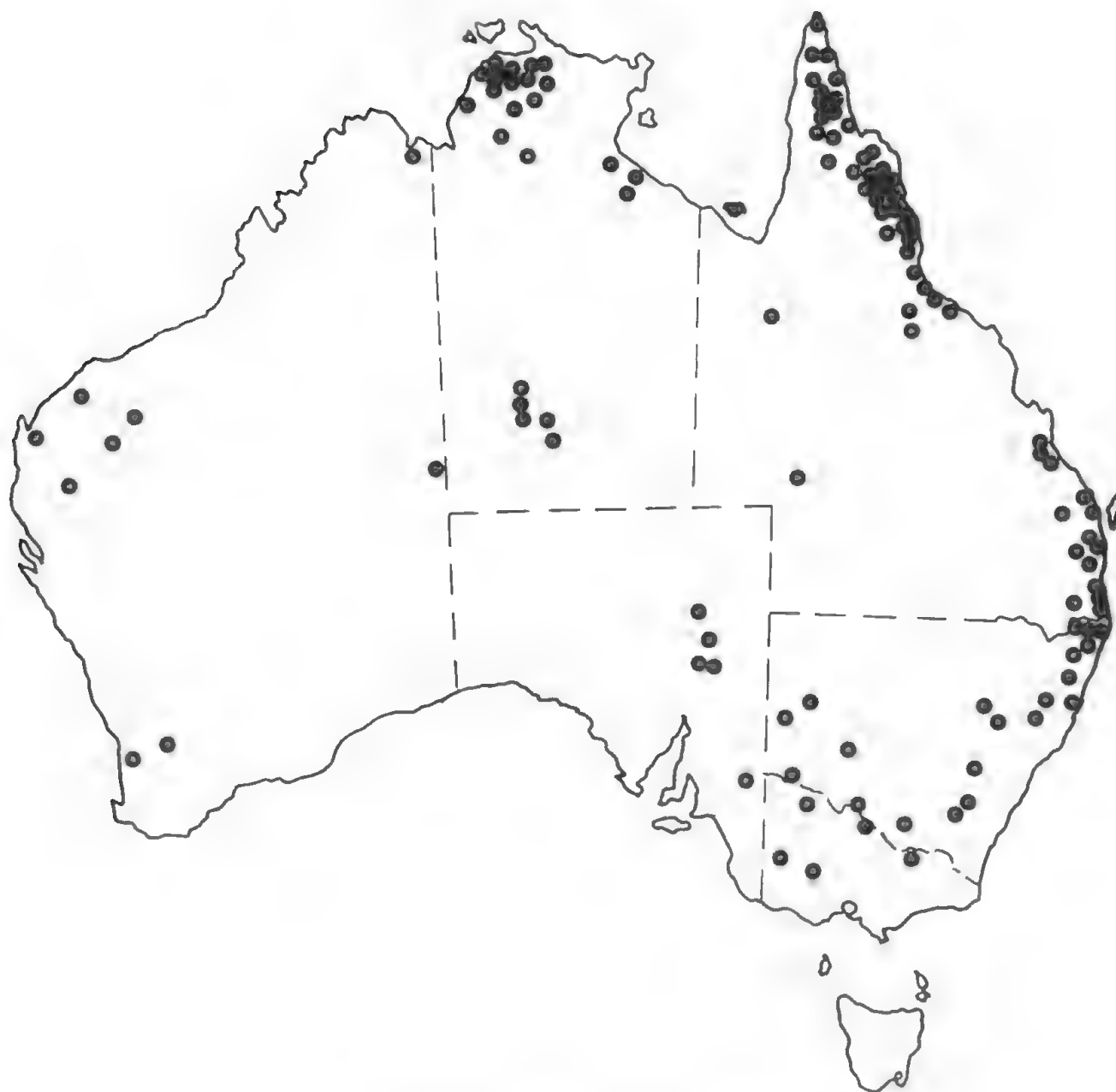
fine punctures as on head, each side with two slanting rows of much larger punctures inwards from edge and to about $\frac{1}{3}$ width; sharply incised groove just inwards of lateral edge and along front edge to about level of inner margin of eye. Fine punctures on elytra weaker than on head, serial punctures much larger, well-marked, in four lines, punctures uneven in size and distribution, those in inner three striae generally in a single line, those in lateral series widely scattered particularly towards shoulder, a row of small punctures immediately inwards from lateral margin. Sternal carina thin, produced backwards in spine reaching a little way beyond hind coxal plates. Maxillary palpi a little shorter than antennae, stout, apical segment a little longer than penultimate, labial palpi stout, apical segment about half length of penultimate. Outer surface of protibia with row of 12-15 large seta-bearing punctures which, apart from some smaller ones close to knee, are even in size. Apical margin of last abdominal sternite complete.

Male

There is little difference between the sexes. The male has the claws on the front tarsi more sharply bent. Tips of parameres extend beyond tips of aedeagus.

Types

Holotype. M. 'Vaughan Springs, N.T. 4/68. C. Watts', in SAMA.

FIGURE 7. Distribution of *S. marginicollis*.

Paratypes. Same data as Holotype, 6 in SAMA, 15 in CW.

Distribution (Fig. 8)

NT — 19°58'S 129°39'E, ANIC; 13°02'S 133°05'E, QM; Alice Springs, SAMA; 30 miles W Alice Springs, CW; 38 km SSE Alice Springs, ANIC; Edith Falls, ANIC; Gove, NMV; Hart Range, NMV; John Hayes Rockhole E Mac. Rng., SAMA; Kakadu NP, CW; Koongarra, ANIC; 15 miles N Mt Cahill, ANIC; Palm Ck, NMV; Standley Chasm, CW, ANIC; Tallipatta Gorge, NMV.

WA — Carson Escarpment, ANIC; 50 miles S Giles, WAM; Gill Pinnacle, WAM; 10 miles W Halls Ck, WAM; Hammersley Range, WAM; 23 km N Millstream, SAMA; Mitchell Plateau, CW; Pincombe R., WAM; Synnott Rng., WAM; Upper Ord R., SAMA; Walsh Pt., CW; Walter James Rng., WAM; White Mountain, WAM. Wittenoon Gorge, WAM; 26 miles W Wittenoon, ANIC; Wotjulum, WAM.

QLD — Enasleigh R. via Mt Surprise, QDPIM; Kennedy Ck, QDPIM; Laura, QDPIM; Townsville, QM.

SA — Everard Rng., SAMA.

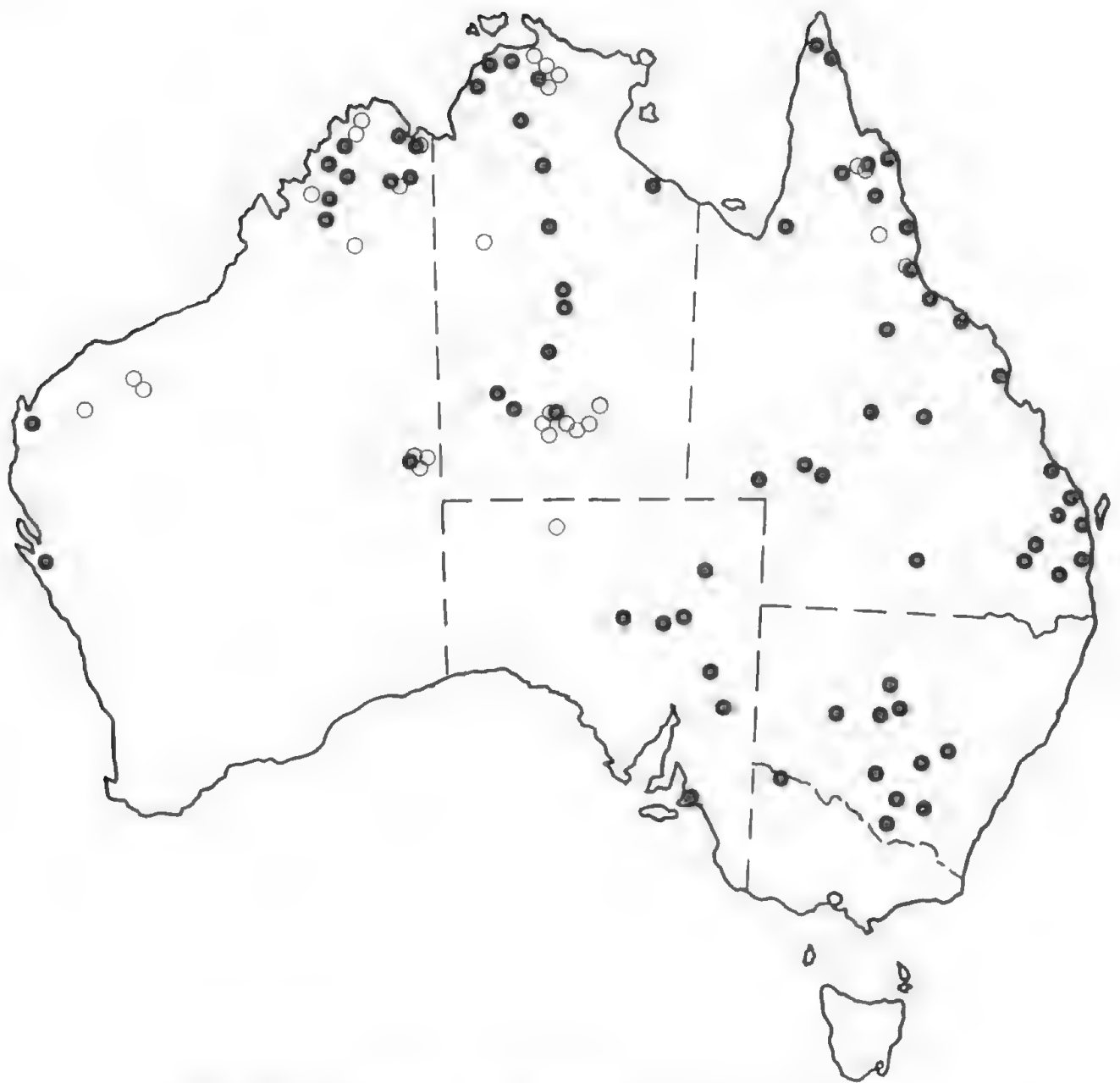


FIGURE 8. Distribution of *S. immarginatus* (●) and *S. australis* (○).

***Sternolophus immarginatus* d'Orchymont**

Sternolophus immarginatus d'Orchymont, 1912, p. 56.

Sternolophus oceanicus Zaitzev, 1910, p. 225, syn. Knisch 1924, p.227.

Description (number examined 261) (Figs 4, 5)

Length 10.6–12.5 mm. Oval, black. Head covered in small but well-marked punctures of variable size, stronger and denser along rear margin, a patch of much larger seta-bearing punctures inward from eye and a ragged semicircle of some 12–15 similar punctures on frons forward of eye, a row of about 12 large seta-bearing punctures together with a scattering of similar punctures towards rear of

clypeus. Front margin of frons emarginate showing yellow membrane beneath, central portion not, or only slightly, triangularly edentate. Punctures on pronotum as on head, a slanting straight line of single large seta-bearing punctures on side near middle and a similar, but curved, row near front margin on each side, well-marked groove along lateral edge extending in much weaker form across front margin. Elytral punctures as on pronotum but somewhat weakened, a row of small punctures along lateral margin with some scattered small elongate punctures inwards. Serial punctures weak, in four rows, punctures erratically placed, those in lateral rows widely scattered. Sternal carina narrow, spine short, blunt, reaching only to about margin of hind coxal plates, mesosternal keel relatively

short with a tuft of very long setae on front angle. Rugose portions on femora weakly restricted to very small area at base. Maxillary palpi elongate, larger than antennae, apical segment same length or slightly longer than penultimate, labial palpi elongate, apical segments slightly more than half length of penultimate. Outer surface of protibia with row of 20-30 seta-bearing punctures, those at base large, becoming progressively smaller towards apex. Apical margin of last abdominal segment complete.

Male

Claws on male protarsi more sharply bent than in female with large basal lobe. Tips of parameres and aedeagus level.

Types

Sternolophus immarginatus d'Orchymont. Holotype. M. 'Northern Territory S. (Neost.) immarginatus, Orch, Type, Dr d'Orchymont Det' in RIB. Seen.

Sternolophus oceanicus Zaitzev, Borneo, Type not located, synonymy after Knisch 1924, p. 227.

Distribution (Fig. 8)

QLD — Blackdown Tableland, QM; Brisbane, SAMA; Bundaberg, ANIC; Burnett R., ANIC; Cairns, ANIC, QM; Calliope R., ANIC; 12 km NNW Camerons Corner, ANIC; Carnarvon Rng., AM; Clermont R., ANIC; Cooktown, NMV; Cunnamulla, SAMA; Dalby, SAMA; Eidsvold, QM; Home Hill, CW; Ingham, ANIC QDPIM; Iron Rng., ANIC; 15 km WNW Johnstone R., QDPIM; Kowanyama, QM; Lake Broadwater via Dalby, QM; Laura, QDPIM; Lockyer Valley, SAMA; 31 km NNW Longreach, ANIC; Mackay, CW; Marina Plains, QDPIM; 7 miles S Marlborough NMV; Mary Ck, ANIC; 40 Mile Scrub, NQ, ANIC; Normanton, SAMA; Stewart Rng., SAMA; Townsville, ANIC, QDPIM; Windorah, ANIC; 55 km W by N Windorah, ANIC.

NT — 80 miles NW Alice Sp., CW; 11 km SW Borraloola, ANIC; Daly R., SAMA; Humpty Doo, ANIC, QDPIM; Katherine, NMV, ANIC; Mataranka, ANIC; Nabarlek Dam, SAMA; 17 miles NNE Newcastle Waters, ANIC; Barrow Ck., SAMA; Paton Valley, NMV; South Alligator R., NMV; Tennant Ck, NMV; 15 miles N Tennant Ck., ANIC; Tiardal, ANIC; 50 miles N Vaughan Sp., CW; Yuendumu, CW.

NSW — 20 miles SSW Bourke, SAMA; Byrock, ANIC; 65 km W Cobar, NMV; Deniliquin, ANIC; Dubbo, AM; Geelong, NMV; 37 km E Hay, SAMA; Mataranka, ANIC; Trangie, ANIC; Wilcannia, SAMA; Yass, NMV.

SA — Clayton Crossing, SAMA; Coopers Ck

Crossing, SAMA; Deep Creek, SAMA; 20 miles N Koonamore Stn., L. Pinpa, SAMA; Lake Eyre, SAMA; Lake Frome, SAMA; Moomba, NMV; 15 km W Sturt Vale, SAMA.

VIC — Irymple, NMV.

WA — 16°40'S 125°29'E, WAM; Argyle Downs, WAM; Beverley Sp. Stn, WAM; Cane R. HS, ANIC; Drysdale R., ANIC; Fitzroy Crossing, ANIC; Gilly Pinnacle, SAMA; Kalumburu, WAM; Kununurra, ANIC; Minilya R., ANIC; Old River, WAM; Wyndham, ANIC.

Sternolophus marginicollis (Hope)

Hydrobius marginicollis Hope, 1842, p. 428.

Sternolophus marginicollis (Hope), Knisch 1924, p. 227.

Hydrobius assimilis Hope, 1842, p. 428, syn. Knisch 1924, p. 227.

Sternolophus nitidulus Macleay, 1871, p. 129; syn. Knisch 1924, p. 227; d'Orchymont, 1912, p. 56; Blackburn, 1888, p. 814.

Hydrobius urtensis Montrouzier, 1860, p. 247, syn. nov.; Zaitzev, 1910, p. 225; d'Orchymont, 1912, p. 56.

Sternolophus tenebricosus Blackburn, 1888, p. 813; syn. nov.; Zaitzev, 1910, p. 225; d'Orchymont, 1912, p. 55; d'Orchymont, 1923, p. 420.

Description (number examined 390) (Figs 2, 3, 6)

Length 10.0-13.5 mm. Narrowly oval, black. Head evenly covered with small unevenly sized punctures strongly impressed, much larger and denser along rear margin, a group of large, seta-bearing punctures just inwards from eye, uneven semicircle of about 15 large seta-bearing punctures on frons forward from eyes, a row of about 15 similar punctures along rear of clypeus; front margin of frons emarginate exposing underlying membrane, central portion of margin more deeply incised in broad triangular shape. Pronotum covered in punctures similar to but a little smaller than those on head, each side with two slanting rows of large seta-bearing punctures, rows usually more than one row of punctures thick. Sharply incised groove adjacent to lateral margin and a weaker groove along front margin very weak or lacking in central portion. Elytron with scattered very small punctures, setose serial punctures, in four rows, distribution of punctures along rows uneven, those in inner three rows more or less in one line, those in lateral stria widely scattered particularly towards shoulder, a row of small punctures along extreme lateral margin of elytron with scattered elongate punctures of roughly the same size immediately inwards from them along elytron except humeral angle. Sternal carina quite stout for genus, particularly mesosternal portion, spine quite large reaching well beyond edge of coxal plate, reaching

nearly to second abdominal segment, and usually ending in sharp point. Outer surface of protibia with a row of 14-30 small seta-bearing punctures which tend to get smaller towards apex. Apical margin of last abdominal segment with small notch in middle.

Mole

Claw on male protarsi more sharply bent than in female. Tips of parameres level with tip of aedeagus.

Types

Hydrobius marginicollis Hope. Port Essington. Holotype (by monotypy) in Hope Department of Entomology, University of Oxford. Seen.

Hydrobius ussimilis Hope. Port Essington. Holotype (by monotypy) in Hope Department of Entomology, University of Oxford. Seen.

Hydrobius artensis Montrouzier. There are three specimens in Bedel's collection now in MNHP from New Caledonia labelled 'Hydrobius Artensis/Montrouzier Nlle Calé', one of which bears a 'type' label. I hereby designate the specimen bearing the 'type' label as lectotype. Seen.

Sternolophus nitidulus Macleay. Four syntype specimens in ANIC on permanent loan from MacLeay Museum labelled 'Gayndah'; 1 specimen in SAMA labelled 'Gayndah Queensland Masters' with a SAMA label in Lea's handwriting 'Sternolophus nitidulus MacL Queensland Cotype'; 2 specimens in AM labelled 'Holotype' which are presumably the two listed by McKeown (1948). I nominate the specimen labelled 'Sternolophus nitidulus McLW. Burnett River' in AM as the lectotype and the other five specimens paralectotypes. Seen.

Sternolophus tenebricosus Blackburn, N. Territory. Holotype (by monotypy), collected by J.P. Tepper in SAMA. Seen.

Distribution (Fig. 7)

QLD — Ashgrove, QM; Ayr, ANIC; Bahinda, AM, SAMA; Bamaga, QM; 20 km S Bloomfield, CW; Bribie I., ANIC; Brisbane, QM; Bundaberg, QM; Cairns, ANIC; Calliope R., ANIC; Cannonvale, ANIC; Canungra Ck, QM; Cape Flattery, QDPIM; Cape Tribulation, QM, QDPIM; 15 km W Captain Billy Ck, QM; 75 km S Cardstone, ANIC; Cardwell, ANIC; Charters Towers, CW; Clermont, AM; Coen, NMV; 40 km N Coen, CW; 60 km S Coen, CW; Cooktown, ANIC; Cooloolo, QM; Daintree, QDPIM; Dalhunny R., CW, QM; 30 km W Fairview, QM; Flying Fish Pt., QM; 18 miles S Gympie, ANIC; Helenslea St., ANIC; Helenvale, CW; Hope Vale Mission, ANIC; Innisfail, ANIC; Iron Rug., ANIC; 15 km WNW S Johnston R., ANIC; Jundah,

ANIC; 2 miles, 5 miles E Kamna, ANIC; Kennedy Cks of Laura, QDPIM; Kingaroy, ANIC; Kirrama Rng., QM; Kowonyama, ANIC; Kuranda, ANIC, SAMA; 5 miles N Kuranda, ANIC; Lakeland Downs, CW; 12 km N Laura, CW; 70 km N Laura, ANIC; Little Laura R., QDPIM; 3 km E Lockerbie, QM; Malanda, CW; Mareeba, ANIC; 26 km E Mareeba, QM; Marina Plains, ANIC; Mary Ck, ANIC; McIlwraith Rng., QDPIM; 21 miles S Miriam Vale, ANIC; 2 miles W Mission Beach, ANIC; Moa I., QM; Mornington I., SAMA; Mossman, QDPIM, ANIC; 15 km NW Mossman, QM; Mt Cook Nl. Pk., ANIC; Mt Coolum, ANIC; Mt Finnigan, ANIC; Mt Moffat, QM; Mt Tambourine, QM; Mt Webb, ANIC; Musgrave, QM; Old Laura Stn., QDPIM; Peach Ck NQ, CW; Peachester, QM; 40 Mile Scrub, QDPIM; Shiptons Flat, ANIC; Silver Plains Hs, ANIC; Stannary Hills, ANIC; Stanthorpe, QM; Tolga, QDPIM; Townsville, NMV; Tully Falls, QM; Walkamin, ANIC; Yeppoon, AM, ANIC; 9 km SE Yeppoon, ANIC.

NT — 80 miles NW Alice Springs, CW; Bagot Ck, NMV; Berry Sp., ANIC; 45 km SW Borrooloola, ANIC; Cape Crawford, ANIC; Daly R. Mission, ANIC; Darwin, CW, NMV; Ellery Ck, NMV; Glen Helen, NMV; Howard Sp., ANIC; Jim Jim Ck., ANIC, SAMA; Kambolgie Ck, CW; Malaranka, ANIC; McArthur R., ANIC; 19 km NEE Mt Cahill, ANIC; Mudginberry HS, ANIC; Nabarlek Dam, SAMA; 11 km SW Nimbuwal Rock, ANIC; Pine Ck, CW; Stn Alligator R., NMV; Tindal, ANIC; Vaughan Sp., CW; Wessel Isl., ANIC; Yuendumu, CW.

ACT — Black Mt, ANIC.

NSW — Brunswick Heads, ANIC; Bulla Bulla tank, CW; Coffs Harbour, ANIC; Corowa, ANIC; Deniliquin, NMV; Dorrigo, ANIC; Eccleston, AM; Gilgandra, CW; Kempsey, QM; Kempsey, SAMA; Mootwingee, ANIC; Orange, ANIC; Pilliga, ANIC; Queanbeyan, ANIC; Stephens Ck, SAMA; Urbenville, QM; Vallery, ANIC; 12 km N Woodenbong, QM.

VIC — Dimboola, ANIC; Echuca, NMV; Eskdale, NMV; Irymple, NMV; Kulkyn, CW; Little Desert, SAMA; Nagambie, ANIC.

WA — 24°20'S 116°50'E, WAM; 23 km WSW Barradale, ANIC; 17 km N Cane R. HS, ANIC; Eginbali, WAM; Kununurra, ANIC; Millstream, ANIC; 13 km NE Newman, ANIC; Toodyay, ANIC; Warburton Rg., SAMA; Warne R., WAM; Wotjulum, WAM.

SA — Coopers Ck Crossing, SAMA; Frome R., SAMA; 185 km S Radium Hill, SAMA; Renmark, ANIC; 24 km N Mt Serle, SAMA.

PNG — Ambuin, ANIC; Bulolo, ANIC; Flaseh Haven, SAMA; Goroka, ANIC; Mt Gyllie, SAMA; Nemasado, CW; Pt Moresby, SAMA; Utai,

ANIC; NE Wau, ANIC; Wau, ANIC.
New Caledonia — Grotte de Ninnin-Rev, SAMA.

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HEMILEIUS (ACARIDA: CRYPTOSTIGMATA: SCHELORIBATIDAE) FROM SOUTH AUSTRALIAN SOILS

D. C. LEE

Summary

Hemileius Berlese, 1916 is rediagnosed and compared with other genera of Scheloribatidae. Three new species; *H. (H.) biclavulus*, *H. (H.) copectus* and *H. (H.) rectus*, are grouped in the nominate subgenus. Two new species, *H. (T.) minimus* (type species) and *H. (T.) paratenuis*, are placed in a new subgenus, *Tenuileius*. These mites occurred most commonly in the litter and soil at the semi-arid, mallee-broombush and mallee-heath sites, but also at three others of the nine florally diverse South Australian sites studied. This is the first record of *Hemileius* from Australia. A key is given to distinguish the species described.

HEMILEIUS (ACARIDA: CRYPTOSTIGMATA: SCHELOBIBATIDAE) FROM SOUTH AUSTRALIAN SOILS

D. C. LEE

LEE, D. C. 1989. *Hemileius* (Acarida: Cryptostigmata: Schelobibatidae) from South Australian soils. *Rev. S. Aust. Mus.* 23(2): 97-111.

Hemileius Berlese, 1916 is rediagnosed and compared with other genera of Schelobibatidae. Three new species, *H. (H.) biclavulus*, *H. (H.) copectus* and *H. (H.) rectus*, are grouped in the nominate subgenus. Two new species, *H. (T.) minimus* (type species) and *H. (T.) paratenius*, are placed in a new subgenus, *Tenuileius*. These mites occurred most commonly in the litter and soil at the semi-arid, mallee-broombush and mallee-heath sites, but also at three others of the rarer florally diverse South Australian sites studied. This is the first record of *Hemileius* from Australia. A key is given to distinguish the species described.

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This is a further part of an ongoing study of sarcoptiform mites in South Australian soils, sampled from nine florally diverse sites, and for which an introduction to the relevant work on the advanced oribatid mites (Planofissuridae) has been published (Lee 1987). *Hemileius* is grouped here in the Schelobibatidae Grandjean, 1933, although it is the nominate of Hemileiidae Balogh & Balogh, 1984, a family without generally accepted validity and based on an arbitrary division in the character state series between the absence and presence of pteromorphs, which is also used in a questionable delineation of *Hemileius* and *Schelobibates* (see under 'Remarks' on *Hemileius*). A new subgenus, *Tenuileius*, is established for species with a hysteronotal shield that is strongly tapered anteriorly, leaving the anterior two setae (Z1 and Z2) close to its lateral margin. The Schelobibatidae is considered further in a paper (Lee & Pajak in press) on this family, which particularly considers *Schelobibates* Berlese, 1908 and a new genus. The only other schelobibatid genus so far known from Australia is *Setobates* Balogh, 1962 (Lee & Pajak 1988).

Whilst all legs (femur-tarsus) have been illustrated in parts of this study, for *Hemileius* it has been considered sufficient to illustrate only leg II, except for one species (*H. rectus*). Measurements are in micrometres (μm). The mites examined were all collected by the author and are mainly deposited in the South Australian Museum (SAMA), but also in the Field Museum of Natural History, Chicago (FMNH) and the New Zealand Arthropod Collection, D.S.I.R., Auckland (NZAC).

NOTATION

The morphological notation is as that used for Schelobibatidae by Lee & Pajak (in press), but the

following elaborations have been made to terms defining external somal ridges. A humeral tectum is distinguished from the larger pteromorph by its width being only subequal to or less than the diameter of the bothridium (base to seta z2). This is an arbitrary division of a character expressed as a continuous series of states through from no recognisable structure; an inconspicuous ridge, to a large wing-like flange or pteromorph. A ridge is considered *partial* if it extends only along part of the usual length covered. Ridges are *linear* if they form a narrow, superficial line; *costate* if they form a rib-like thickening; *laminal* if the thickening bears a flange. Ridge (or carina) *kf* (see Grandjean 1953, Fig. 2A) is here termed the *subtutorium*, a linear or costate proteropleural ridge level with acetabulum I. The subtutorium is not homologous with the tutorium since they can occur together as in *Muliercula ngoyensis* (Coetzer, 1968 Fig. 10), the tutorium running along part of a line between setae j1-z2. So far in this study no tutoria have been recognised.

SYSTEMATICS

Genus *Hemileius* Berlese

Hemileius Berlese, 1916, p. 322. Type species (original designation): '*Protobibates (Schelobibates) initialis* Berl.' Grandjean, 1953, p. 119. Coetzer, 1968, p. 23. C. Pérez-Iñigo, 1984, p. 170.

Diagnosis

Schelobibatidae. Hysteronotum with 10 pairs of medium length or short setae (no microsetae). Pteromorph absent, humeral tectum may be present. Proteronotal setae j2-j2 separated by gap 1.25 $\times$ or less distance j2-z1. Dorsosejugal furrow

complete and curved forward between lamellae, not straight. Femurs I and II with short stalk encompassed by collar and recess in caput so that pedestal and caput nearly abut. Tibiae without proximoventral cuticular spurs. Tarsus I usually with three (av1, pv1, v2) proximoventral setae, rarely v2 absent. Solenidia on tibiae III and IV taper distally (no microglobular tip). Pretarsus usually with three, rarely with two (central and anterior) claws, lateral claws without subterminal tooth and slimmer than central claw, but at least as stout as tarsal setae d4 at halfway along their length.

General morphology of Australian species

General appearance bulbiform or subrectangular with somal setae, except for proteronotal files j and z , fine and short, and legs short and stout or of medium-girth. Anterior margin of hysteronotal shield not obscuring aperture of bothridium to seta $z2$. Four pairs of normal (not fissuriform) sacculate hysteronotal foramina and smooth (without tubercles or longitudinal striae) integument. Proteronotal sensory seta ($z2$) capitate, lanceolate or fusiform, not setiform. Translamellar line (between $z1$ - $z1$) absent. Prelamella (between setae $j1$ - $z1$ or rostral margin- $z1$) costate or lineate, either may be partial. Lamella and sublamella weakly laminar, bothridium abuts onto lamella. Subtutorium straight or curved, linear or costate. Somal chaetotaxy: $2j$, $2a$, $1s$; $2j$, $6z$, $2S$; $3I$, III , $3III$ (rarely 2), $3IV$; $4JZg$, $1Sg$; $2JZa$, $3Sa$; one lateral coxite seta ($III3$) may be microseta (*H. copectus*), note its absence on *H. (T.) tenuis*. Discidium rudimentary, either costate or flange height less than twice width of setal base $IV3$. Circumpedal ridge either absent or, if present, not reaching margin of opisthosternal shield. Mid-coxisternal groove present or absent. Leg chaetotaxy usually I — Tr 1, Fe 5, Ge 2 (1 so), Ti 4 (2 so), Ta 18 or 19 (2 so); II — Tr 1, Fe 5, Ge 2 (1 so), Ti 4 (1 so), Ta 15 (2 so); III — Tr 2, Fe 3, Ge 1 (1 so), Ti 3 (1 so), Ta 15; IV — Tr 1, Fe 2, Ge 2, Ti 3 (1 so), Ta 12. Variation on tarsus I because seta v2 present or absent. Order of diminishing leg length — I, IV, II, III; of diminishing maximum tibial height — I, II, IV, III (or III = IV). Flanges on femurs (even femur II) small or absent. Porose areas either present or absent on femurs and trochanters III and IV, but absent on tibiae and tarsi. Trochanter IV with caput length subequal to its height, curved dorsal surface so that subglobular in profile, crown forms a distoventral crescent-shaped flange sometimes weakly bilobed.

Remarks

Hemileius is very similar to *Scheloribates*, as suggested by Grandjean (1953), the major recognised difference being the presence or absence

of a pteromorph. Despite this, Balogh & Balogh (1984) established the Hemileiidae, delineating it from the Scheloribatidae on the basis of this character. But the recognition of a pteromorph is subjective (Norton & Palacios-Vargas 1987), although artificially defined here (see under 'Notation'). The Hemileiidae is therefore to be synonymised (Lee & Pajak in press) with Scheloribatidae until a convincing delineating diagnosis is provided. It is also arguable that *Hemileius* should be regarded as a junior synonym of *Scheloribates*, because there is a strong similarity between *Hemileius rectus* sp. nov. and a small species of *Scheloribates* from the mallee-heath site (see Lee & Pajak in press) and *Hemileius initialis* (type species) is similar to some larger *Scheloribates* species.

In relation to other members of the Scheloribatidae, *Hemileius* is also superficially very similar to other members of the Hemileiinae Balogh & Balogh, 1984, as well as five genera (*Cryptozetes* Hammer, 1962; *Domatorina* Grandjean, 1951; *Metaleius* Trávě, 1960; *Paraleius* Trávě, 1960 and *Siculobata* Grandjean, 1953) overlooked by Balogh & Balogh (1984) in their review of the Oripodoidea (as 'Oribatuloidea'). Members of these five genera are adequately described, but their relationships are uncertain. *Cryptozetes*, *Domatorina* and *Siculobata* are principally epiphytic or saxicolous mites and their relationships are discussed by Norton & Palacios-Vargas (1987) in terms of specialisations, often regressive synapomorphies, for being epiphytic and derived from character states of edaphic genera such as *Hemileius*. It should be noted that whilst pteromorphs, pleural recesses delineated by circumpedal ridges or processes, and angular leg segment shapes are derived in the Oripodoidea, the loss of hysteronotal setae by *Hemileius* suggests that its lack of such character states may represent regressive synapomorphies, possibly for living in deeper soil layers, and sometimes it may also be saxicolous or epiphytic. The five species described here illustrate the problems of defining scheloribatid genera and diagnosing a genus such as *Hemileius*. They are smaller than the established species and also differ in lacking porose areas on the tibiae and tarsi. The species most superficially similar to the type species, *H. biclavulus*, differs in having only two pretarsal claws and it also lacks a proximoventral seta on tarsus I as for *Cryptozetes*, *Domatorina* and *Siculobata*. Another species, *H. rectus*, shows similarities to *Scheloribates*, whilst *H. copectus* is intermediate in form. Two species, *H. minimus* and *H. paratenuis*, are similar to the previously established *H. tenuis* Aoki, 1982, may represent a lineage adapted for deeper soil layers, and are referred to a new subgenus, *Tenuileius*. If there is

more confidence in the similarity between its members not reflecting convergence, then it might be better regarded as a genus. The formal diagnosis of *Hemileius* used by Coetzer (1968), that implied by the couplets in the keys of Balogh & Balogh (1984), as well as that provided here, may not indicate relationships.

To establish the number of known species in *Hemileius* is difficult. Initially the genus (as a subgenus of *Oribatula*) included eight species, of which one had a subspecies (as a variety), and for which the descriptions had limited value. Three of these species became the types of either *Dometorina*, *Siculobata* or *Liebstadia*, whilst the other four species have rarely been referred to since. Coetzer (1968) excluded four species from *Hemileius*, that had previously been in *Liebstadia* (multiporose rather than sacculate foramina) or *Schelorbates* (pleromorph present). Of the seven species newly combined with *Hemileius* by Coetzer (1968), C. Pérez-Iñigo (1984) excluded one and suggested that the other six, as well as the four rarely referred to species grouped in *Hemileius* when it was established, should probably also be excluded. The 15 species grouped here in *Hemileius* are listed under the two subgenera.

KEY TO SOUTH AUSTRALIAN *HEMILEIUS* SPECIES (ADULTS)

- 1 — Setal distance $\pm 2-Z1$ $0.8\times$ or less distance $\pm 2-j2$. Hysteronotal humeral margin convex with tectum. If pedotectum II extends laterally further than I, then humeral tectum extends further still. *Hemileius (Hemileius)* Berlese, 2.
 - Setal distance $\pm 2-Z1$ subequal to distance $\pm 2-j2$. Hysteronotal humeral margin concave, without humeral tectum. Pedotectum extends laterally further than I. *Hemileius (Tenuileius)* subgen. nov., 4.
- 2 — Interlamellar seta ($j2$) medium-length, able to reach $z1$. Setal distance $II-I$ about $2\times$ distance $III-III$. Short midsternal apodeme level with setae III and III_1 *H. (Hemileius) copectus* sp. nov.
 - Interlamellar seta ($j2$) long, able to reach $j1$. Setal distance $II-I$ subequal to distance $III-III$. No midsternal apodeme. 3
- 3 — Pretarsi with two claws. Humeral tectum width about $0.3\times$ diameter of bothridium (base to seta ± 2). Hysterosoma bulbiform. Pedotectum II not extended laterally as far as I. *H. (Hemileius) biclavulus* sp. nov.
 - Pretarsi with three claws. Humeral tectum width subequal to diameter of bothridium (base to seta ± 2). Hysterosoma parallel-sided.

Pedotectum II extends laterally further than I
..... *H. (Hemileius) rectus* sp. nov.

- 4 — Sensory seta ± 2 caput subglobose. Subtutorium extends forward to near seta $z1$. Hysteronotal shield very narrow, seta $Z2$ as close to margin as diameter of its base. Gap between genital orifice and anterior sternal margin $1.5\times$ or more distance between genital and anal orifice. *H. (Tenuileius) minimus* sp. nov.
 - Sensory seta ± 2 caput fusiform. Subtutorium not extended forward to near seta $z1$. Hysteronotal shield narrow, seta $Z2$ more than $0.5\times$ its length away from margin. Gap between genital orifice and anterior sternal margin less than $1.5\times$ distance between genital and anal orifice. *H. (Tenuileius) paratenais* sp. nov.

Subgenus *Hemileius* (*Hemileius*) Berlese

Diagnosis

Hemileius. Hysteronotal seta $Z1$ near to anterior margin of hysteronotal shield (distance $\pm 2-Z1$ $0.8\times$ or less distance $\pm 2-j2$). Hysteronotal shield wide with convex humeral tectum dorsally obscuring pleural striated cuticle and leaving seta $Z2$ more than its length away from margin. Pedotectum II usually not extending laterally further than I; if it does, then humeral tectum extends further still.

General morphology of Australian species

Colour shiny brown or yellowish-brown. Smaller than established species (247–447 compared to 450–710). Legs short (mean femur-tarsus length: $36-40\%$ of somal length) and tibiae medium-girth to stout (mean maximum height: $38-49\%$ of mean length). Humeral tectum and limbus widths between $0.3\times$ and subequal to diameter of bothridium, but not correlated (e.g. *H. biclavulus* with inconspicuous humeral tectum and broad limbus), limbus encompassing entire hysteronotum behind humeral tectum. Sacculate foramina with slit-shaped or round pores.

Distribution

Although some species from the Southern Hemisphere have been grouped in *Hemileius*, previously established species currently in this genus all appear to be known only from the Northern Hemisphere. Records and species numbers are greatest from southern parts of northern temperate regions, either around the Mediterranean and Canary Islands (Pm) or in the United States of America (Nr, Na) and Hawaii (Ap). Records from further north (Pe, Nn) are limited to *Hemileius initialis* in Europe and to *H. quadripilis* and an unidentified species in Canada (Marshall, Reeves & Norton 1987).

The three new species of *Hemileius* (*Hemileius*) from South Australia appear to be the only Southern Hemisphere records. Two species occur in large enough numbers at relatively dry semi-arid, mallee-broombush and mallee-heath sites to support their ecological categorisation as hemiedaphic or, in the case of the smaller species, as possibly being euedaphic. The other species, *Hemileius copectus*, is mainly found (32 adults) at the semi-arid site, but is also represented by a single specimen at both sclerophyll forest and pine forest sites, suggesting that an edaphic species at a drier site may be saxicolous or epiphytic at the moister sites and so poorly represented in soil and litter samples.

Remarks

Hemileius (*Hemileius*), the nominate subgenus, includes a heterogeneous majority of species in the genus. It ranges in form from the type, which is somewhat like *H. biclavulus* and has similarities to the epiphytic *Dometorina* for example, to *H. rectus* with similarities to some *Scheloribates*.

The following 12 species are grouped in *Hemileius* (*Hemileius*): *H. (H.) biclavulus* sp. nov.; *H. (H.) comatus* Berlese, 1920; *H. (H.) copectus* sp. nov.; *H. (H.) elongatus* E. Pérez-Iñigo, 1978; *H. (H.) gressitti* Balogh & Balogh, 1983; *H. (H.) haydeni* (Higgins & Woolley, 1975); *H. (H.) hierrensis* C. Pérez-Iñigo, 1984; *H. (H.) initialis* (Berlese, 1908), type species; *H. (H.) nicki* Denmark & Woodring, 1965; *H. (H.) quadripilis* Fitch, 1856 (syn. *pallida* Ewing, 1909); *H. (H.) rectus* sp. nov.; *H. (H.) robustus* C. Pérez-Iñigo, 1969.

The generic placement of *H. (H.) quadripilis* is problematic (see Marshall, Reeves & Norton 1987), but its synonymy with *H. (H.) pallida* Ewing, 1909 is accepted, although *H. (H.) pallida* Ewing; Hanlmer, 1952 from Canada (Nn) may not be conspecific with it, having substantially shorter hysteronotal setae.

Hemileius (*Hemileius*) *biclavulus* sp. nov.

Figs 1, 2 and 8

Female

Dorsal profile usually bulbiform, sometimes more parallel-sided than illustrated (Fig. 1). Idiosomal length, 404 (25, 380–447). Leg lengths (femur–tarsus for idiosomal length 411): I — 198, II — 161, III — 136, IV — 163. Tibial maximum heights (for 411): I — 23, II — 18, III — 15, IV — 15.

Proteronotum with incomplete prelammella extending from seta *j*1 only halfway towards *z*1. Lamella and sublammella costate, sublammella less robust, runs close to lamella along anterior half, bothridium (base *z*2) closer to lamella. Subtutorium

linear and straight, with alveolate sculpturing posterior and ventral to it. Setae *j*1, *j*2, *z*1 inconspicuously ciliate, interlamellar (*j*2) and lamellar (*z*1) setae long, *j*2 reaching to level of *j*1, and *z*1 reaching beyond rostral apex. Sensory seta (*z*2) long, reaching *z*1; exposed stalk slightly longer than caput (appears shorter in Fig. 1 because sloping dorsalwards); caput fusiform, three files of cilia, maximum of seven cilia in any file, parallel-sided when viewed dorsally (Fig. 1), uniconvex viewed laterally. Seta *s*2 length about twice diameter of bothridial aperture.

Hysteronotal setae subequal in length, but *J*6, *Z*6, *S*6 slightly longer. Humeral tectum small but limbus substantial, width about $\times 0.3$ and subequal to diameter of bothridium respectively. Two pairs of unnamed pores (usually anterior pair between seta *Z*2–foramen *F*3, posterior pair between seta *S*5–midline; rarely anterior pair between foramen *F*3–midline or third pair between *Z*4–midline). Slit-like pore *h*/3 short, approximately transverse; *h*/4 and *h*/5 parallel to lateral margin, visible ventrally (not illustrated in Fig. 2, too near margin), *h*/6 oblique, adaxial end posterior. Sacculate foramina with slit-shaped pores.

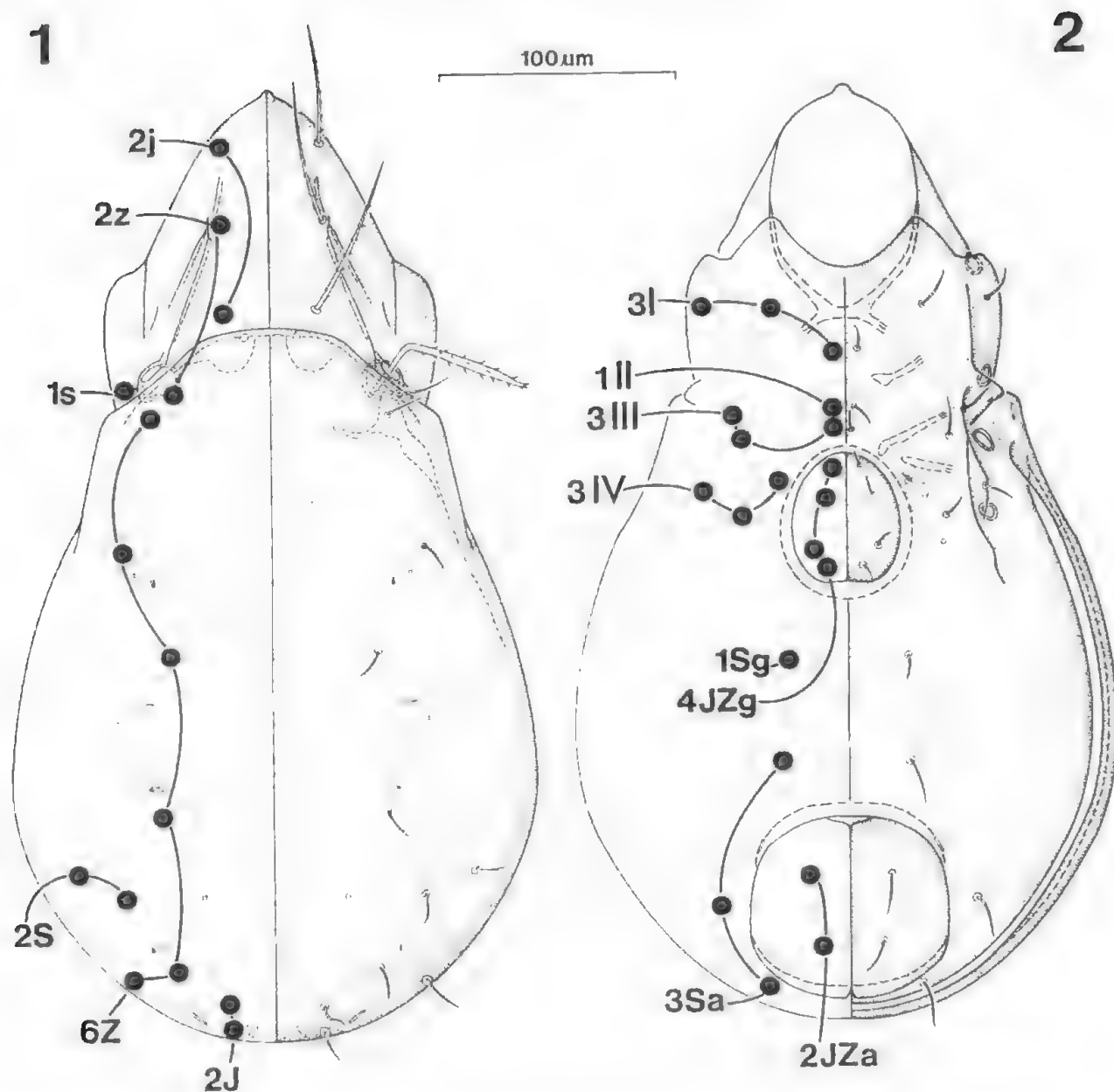
Podosternum with medium gap (about $0.66 \times$ setal distance *II*–*III*) between apodemes I. Adaxial end of apodeme III base latitudinally level with genital seta *J*21 and longitudinally level with coxite seta *IV*1. Custodial ridge present. Discidium forms shallow flap (depth about twice diameter of setal base *IV*3). Circumpedal ridge reaching forward to merge with discidial ridge and backward so that half of its length lies posterior to aperture to acetabular cavity IV. Alveolate sculpturing along midcoxite region (Fig. 2, illustrated only on coxite IV). No midsternal apodeme. Lateral coxite setae longer than those around genital shield.

Opisthosternum with genital setae less than half length of anal setae. Eggs subcylindrical, 189×85 (2 eggs, 47% of somal length 401), rugose exochorion. Number of eggs in female (number of females) as follows: none (12), one (3), two (12), three (9), four (4).

Legs short (mean femur–tarsus length: 40% of soma). Dorsal porose area on all femurs and trochanters III and IV. Rugae posteriorly on femurs III and IV. Shallow ventral flanges on keels of femurs II, III and IV. Solenidium *sol* on tarsus I subequal in diameter to base of seta *d*3, and reaching setae *d*4. Only five ventral setae on tarsus I, proximoventral seta *v*2 absent, proximal three with 8 to 10 cilia (longest cilium longer than setal base diameter). Pretarsi with two claws (anterior slim and central stout claw).

Male

As female, except proteronotal setae in files *j* and



FIGURES 1 AND 2. *Hemileius (Hemileius) biclavulus* sp. nov., female soma. 1, notum; 2, idiosternum.

z may be slightly longer. Soma smaller; idiosomal length 367 (mallee-heath, 25, 339–373) and 362 (mallee-broombush, 1).

Material examined

Holotype: ♀ (N198887), sand, litter, under banksia shrubs (*Banksia ornata*), Tamboore Homestead (35°57'S, 140°29'E), 4.viii.1974.

Paratypes: 27 ♀♀ (N198888–N1988114), 72 ♂♂ (N1988115–N1988186), same data as holotype; 2 ♀♀, 2 ♂♂ — FMNH; 2 ♀♀, 2 ♂♂ — NZAC.

Undesignated: 120 ♀♀, 309 ♂♂, same data as holotype. Single ♂ (N1988187), sand, litter, sparse moss, under ridge-fruited mallee (*Eucalyptus incrassata*) amongst broombush shrubs (*Melaleuca uncinata*), Ferries-McDonald Reserve (35°15'S, 139°09'E), 20.vi.1974.

Distribution

Australia (Aa). South Australia. Mallee-broombush, open scrubland (Ferries-McDonald Reserve), Murray-Darling basin, 1 ♂/1 of 8 × 25 cm². Mallee-heath, tall open shrubland (Tamboore Homestead, near Mt Rescue Conservation Park), Murray-Darling basin, 148 ♀♀, 381 ♂♂/8 of 8 × 25 cm².

Remarks

H. biclavulus is the largest South Australian species of *Hemileius* with similar facies to the slightly bigger type species, *H. initialis*. On the other hand, *H. biclavulus* is unique in the subgenus in having only two pretarsal claws and five ventral setae on tarsus I (a reduced ventral setation on

tarsus I is also recorded for the epiphytic *Cryptozetes*, *Dometorina* and *Siculobata*). Although given a minor weighting here, these two characters have been used to diagnose oripodoid genera.

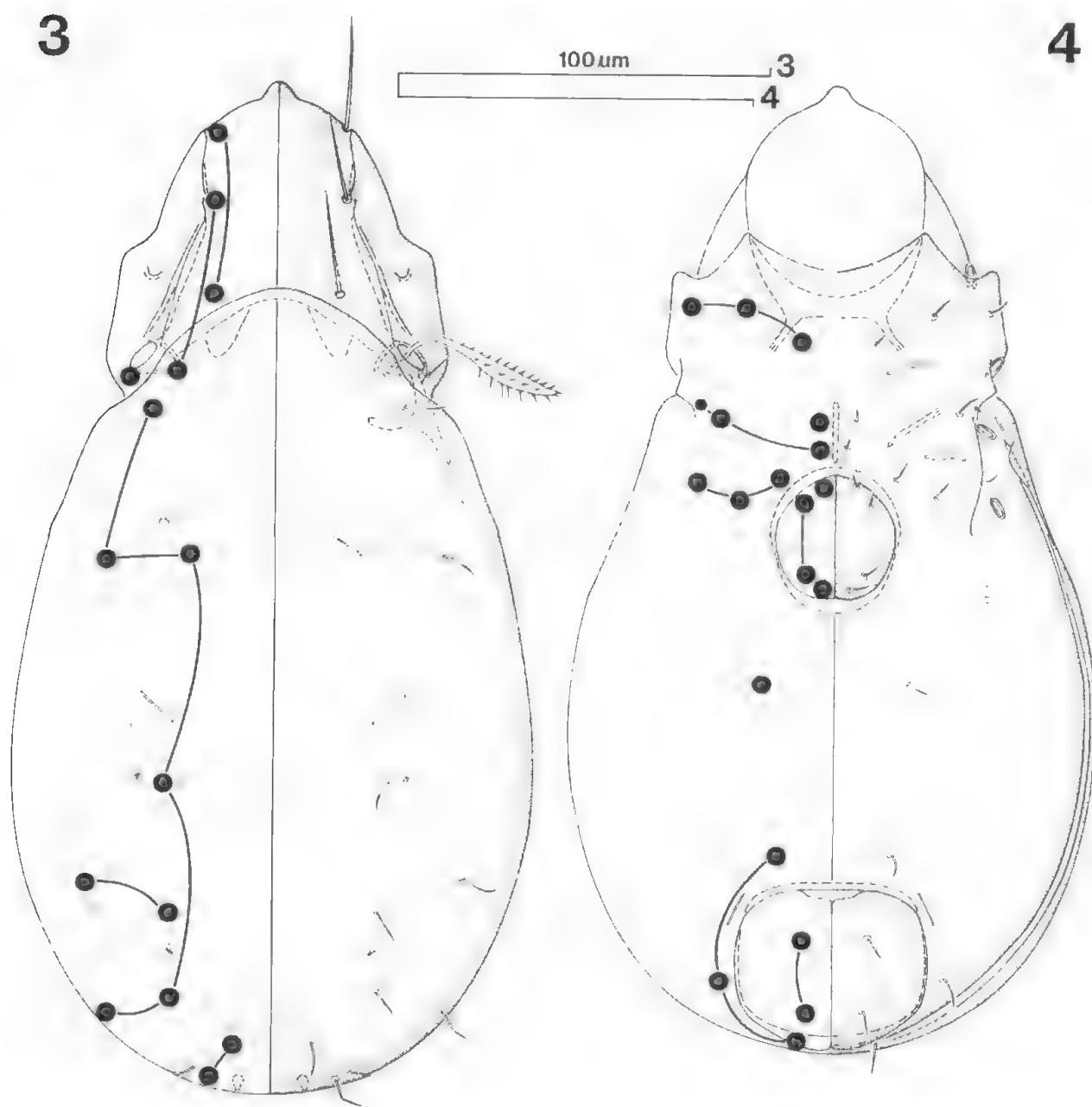
***Hemileius (Hemileius) copectus* sp. nov.**
Figs 3, 4 and 9

Female

Dorsal profile ovoid. Idiosomal length, 278 (semi-arid shrubland, 10, 262–288) and 270 (sclerophyll forest, 1). Leg lengths (femur–tarsus for idiosomal length 276, semi-arid shrubland): I — 123, II — 108,

III — 95, IV — 111. Tibial maximum heights (for 276): I — 15, II — 13, III — 12, IV — 12.

Proteronotum with complete prelamella (seta *j1*–*z1*–rostral margin), costate near *j1*, rest linear. Lamella laminar, sublamella costate, runs close to lamella along anterior half (may appear more robust from some angles because more refractile), bothridium (base of seta *z2*) closer to lamella. Subtutorium semicircular, linear. Setae *j1*, *j2*, *z1* inconspicuously ciliate, interlamellar (*j2*) and lamellar (*z1*) setae medium-length; *j2* reaching *z1*, *z1* reaching *j1*. Sensory seta (*z2*) long, reaching *z1*; exposed stalk slightly shorter than caput (appears even shorter in Fig. 4 because sloping dorsalwards); caput fusiform, three files of cilia, anterior file on



FIGURES 3 AND 4. *Hemileius (Hemileius) copectus* sp. nov., female soma. 3, notum; 4, idiosternum.

straight margin with 14–16 cilia along caput and stalk, other files with 6–8 cilia confined to caput. Seta *s2* length subequal to diameter of bothridial aperture.

Hysteronotal setae subequal in length, but *J6*, *Z6*, *S6* slightly larger. Humeral tectum and limbus small, width of both $\times 0.3$ diameter of bothridium. Unnamed pores not located. Slit-like pore *hf3* oblique, adaxial end posterior, *hf4* and *hf5* parallel to lateral margin, visible ventrally (not illustrated in Fig. 4, too near margin), *hf6* oblique, adaxial end anterior. Sacculate foramen *F3* with round pore, whilst *F4*, *F5*, *F6* with slit-shaped pores.

Podosternum with wide gap (subequal to *II–III*) between apodemes I. Adaxial end of apodeme III base latitudinally level with coxite seta *III1* and on longitudinal line closer to coxite seta *IV2* than *IV1*. Midsternal apodeme between setal pairs *III1* and *III1*. No custodial ridge. Discidial ridge without discidium. No circumpedal ridge. Pedotectum II short, not extending as far laterally as pedotectum I. No midcoxite sculpturing or midsternal apodeme. Coxite setae all short, *II1* and *III1* particularly short, seta *III3* inconspicuous microseta.

Opisthosternum with genital setae more than half length of anal setae, but adanal setae *Sa2*, *Sa3* longer. Eggs subcylindrical, 157×82 (1 egg, 55% of somal length 285), granulate exochorion. Number of eggs in female (number of females) as follows: none (9), one (3).

Legs short (mean femur–tarsus length: 40 % of soma). Indistinct porose area on femurs and trochanters III and IV. Indistinct rugae on femurs III and IV. No ventral flanges on keels (not discernible from lateral aspect) of femurs II, III, IV. Solenidium *sol* on tarsus I subequal in diameter to base of setae *d3*, and reaching setae *d4*. Six ventral setae on tarsus I, proximoventral seta *v2* present, proximal four with three or four cilia (longest cilium longer than setal base diameter). Pretarsi with three claws (central stout claw, lateral slim claws).

Male

As female, except soma smaller, idiosomal length, 259 (semi-arid shrubland, 18, 252–271) and 262 (pine forest, 1).

Material examined

Holotype: ♀ (N1988188); soil, litter, moss and other low growth plants under bladder saltbush (*Atriplex vesicaria*) amongst sparse false sandalwood (*Myoporum platycarpum*), Koonamore Vegetation Reserve (32°07'S, 139°21'E), 27.vi.1974.

Paratypes: 9 ♀ ♀ (N1988189–N1988197), 18 ♂ ♂ (N1988198–N1988215), same data as holotype.

Undesignated: 2 ♀ ♀ and 2 ♂ ♂ lost, same data as holotype. Single ♀ (N1988216), soil, litter, sparse

moss, under sclerophyllous shrubs amongst messmate stringybark (*Eucalyptus obliqua*), nr summit of Mt Lofty, Cleland Conservation Park, 34°59'S, 138°45'E, 9.v.1974. Single ♂ (N1988217), soil, litter, under *Pinus pinea*, Kuitpo Forest Reserve (35°12'S, 138°41'E), 22.v.1974.

Distribution

Australia (Aa), South Australia. Semi-arid low shrubland (Koonamore Vegetation Reserve), Lake Eyre Basin, 12 ♀ ♀, 20 ♂ ♂/6 of 8×25 cm². Sclerophyll forest (Mt Lofty, Cleland Conservation Park), South gulfs, ♀/1 of 8×25 cm². Cultivated pine forest (Kuitpo Forest Reserve), South gulfs, ♂/1 of 8×25 cm².

Remarks

H. copectus is distinguishable from non-Australian species in the nominate subgenus by its small size and only medium-size proteronotal setae *z1* and *j2*. It is similarly distinguishable from *H. biclavulus*, whilst *H. rectus*, which is of a similar size, has long proteronotal setae and a more substantial humeral tectum. Ventrally, coxite seta *III3* is reduced to a microseta, drawn slightly larger in illustration (Fig. 4) so that it is recognisable, and there is a short midventral apodeme anterior to the genital shield, both unique character states for the genus.

Hemileius (Hemileius) rectus sp. nov.

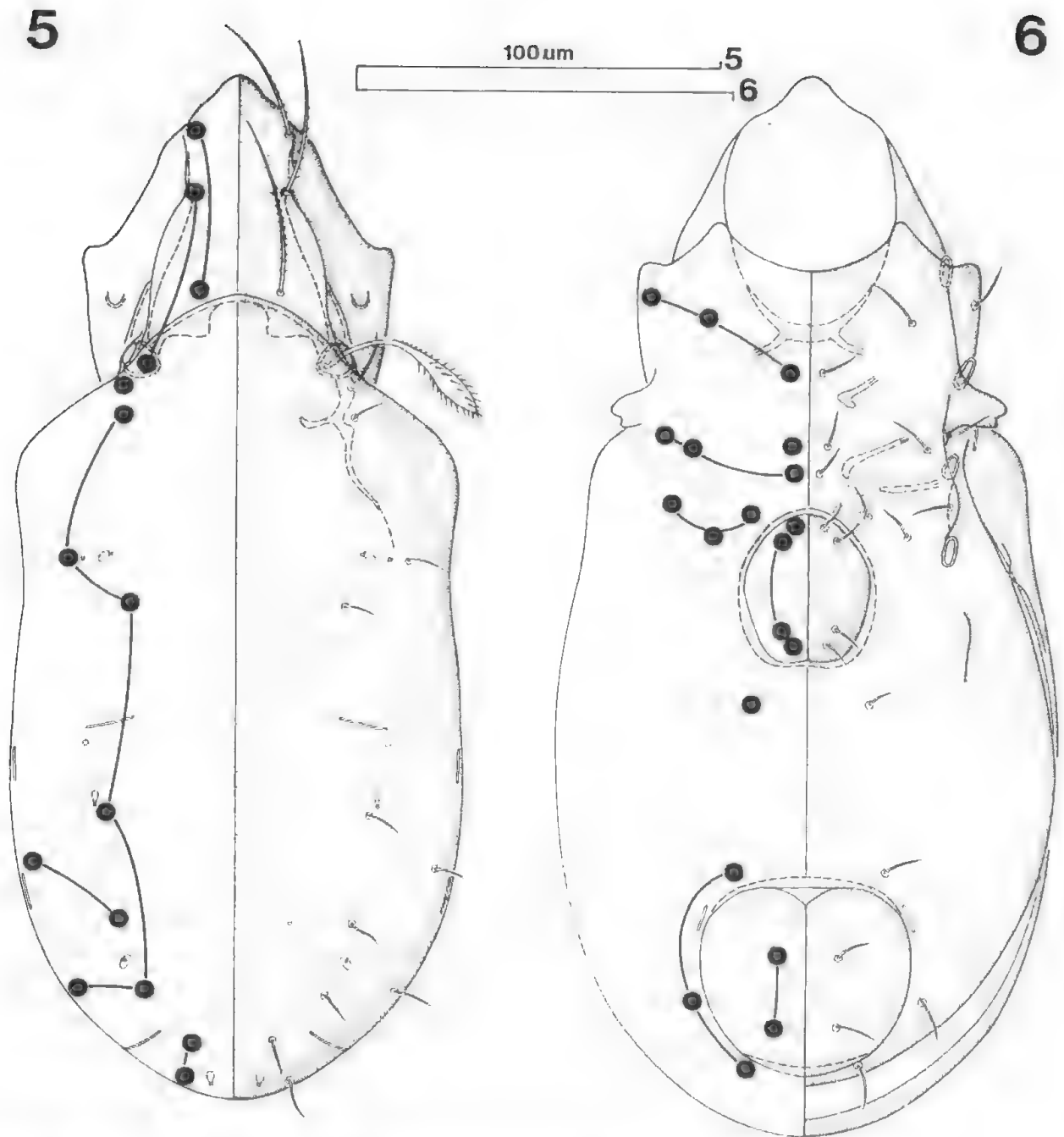
Figs 5–7

Female

Dorsal hysteronotal profile subrectangular, partly due to humeral tecta. Idiosomal length, 280 (25, 260–300). Leg lengths (femur–tarsus for idiosomal length 293): I — 121, II — 105, III — 85, IV — 113. Tibial maximum heights (for 293): I — 18, II — 15, III — 13, IV — 14.

Proteronotum with complete prelamella (seta *j1–z1*), costate near *j1*, rest linear. Lamella mainly laminar, costate near *z2*. Sublamella costate, runs close to lamella along anterior half, bothridium (base seta *z2*) closer to lamella. Setae *j1*, *j2*, *z1* inconspicuously ciliate, interlamellar (*j2*) and lamellar (*z1*) setae long; *j2* reaching level of *j1*, *z1* reaching beyond rostral apex. Sensory seta (*z2*) medium-length, reaching beyond *j2*; exposed stalk shorter than caput; caput fusiform, three files of cilia, anterior file with 16–18 cilia along caput and stalk, medium file with 8–9 cilia and posterior file with 11–13 cilia confined to caput. Seta *s2* length about $1.5 \times$ diameter of bothridial aperture.

Hysteronotal setae subequal in length, but *J6* and *Z6* slightly longer. Humeral tectum conspicuous, width about $0.25 \times$ distance *Z1–Z2*; limbus small,



FIGURES 5 AND 6. *Hemileius (Hemileius) rectus* sp. nov., female soma. 5, notum; 6, idiosternum.

width about $0.1 \times$ distance Z1-Z2. Unnamed circular pores present between and near setae Z2 and S4. Slit-like pore *hf3* oblique, with adaxial end anterior, sometimes transverse, rarely adaxial end posterior (one side only), *hf4* and *hf5* visible dorsally (Fig. 5), *hf6* oblique with adaxial end anterior. Sacculate foramina with round pores.

Podosternum with medium gap (about two thirds II-III) between apodemes I. Adaxial end of apodeme III base latitudinally level with point anterior to genital shield and longitudinally level with point closer to coxite seta IV1 than IV2.

Custodial ridge present. Discidium forms a shallow flap (depth about twice diameter of setal base IV3). Short straight circumpedal ridge separate and well behind other subpodal ridges. Weak alveolate sculpturing along mid-coxite region (Fig. 6, illustrated only on coxite IV). No midsternal apodeme. Pedotectum II robust, long, extending further laterally than pedotectum I. Lateral coxite setae longer than those around genital shield.

Opisthosternum with genital setae about two-thirds length of anal setae. One female with 6JZg on one side (extra seta halfway between JZg2-JZg3).

7

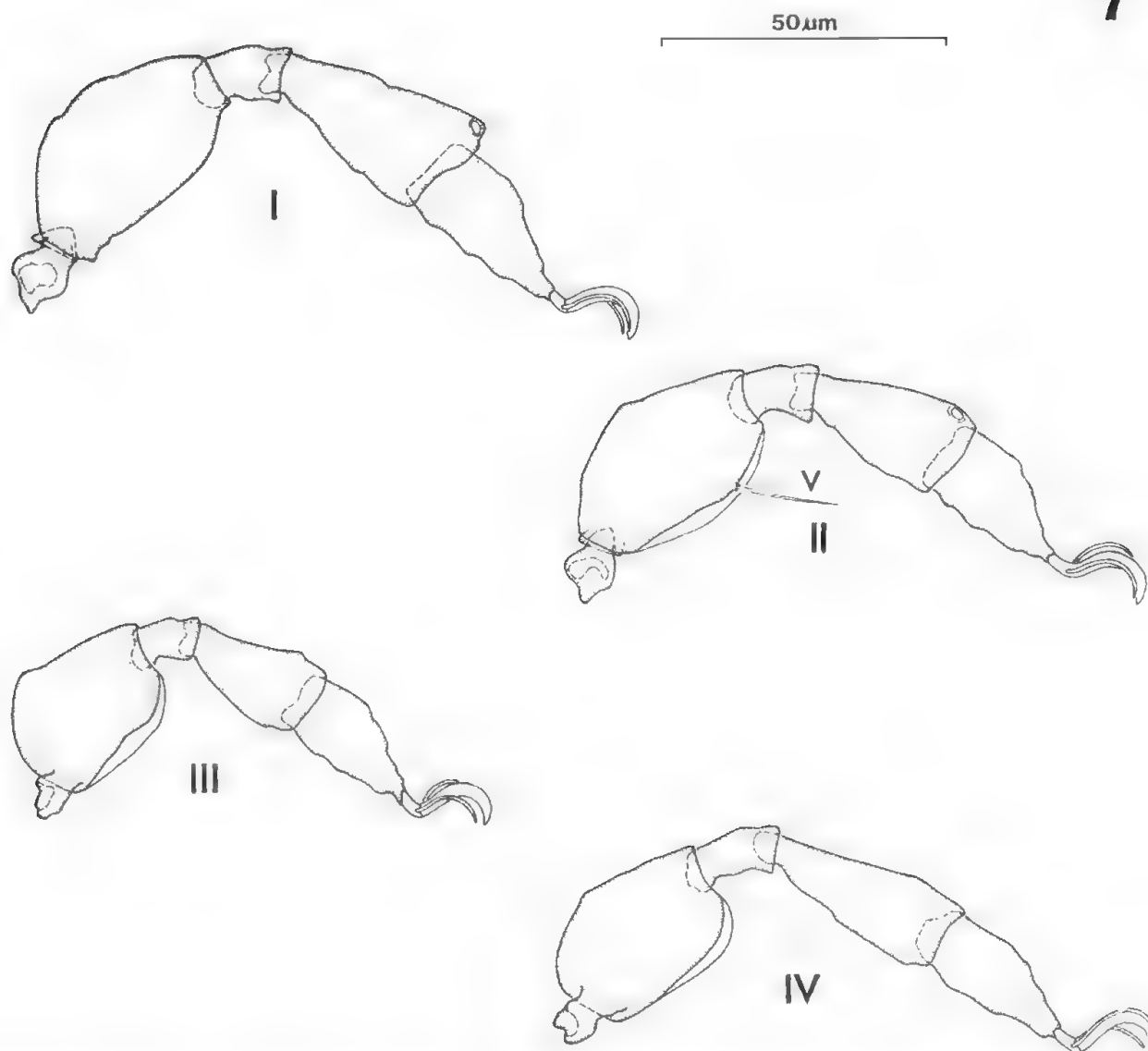


FIGURE 7. *Hemileius (Hemileius) rectus* sp. nov., posterior aspect to femur-pretarsus of right legs showing only one seta.

Eggs oval, 139×80 (1 egg, 50% of somal length 278), granular exochorion. Number of eggs in female (number of females) as follows: none (30), one (36), two (5).

Legs short (mean femur-tarsus length: 36% of soma). Porose areas on femurs and trochanters III and IV. Indistinct or no rugae on femurs I and II, distinct rugae on femurs III and IV. Shallow ventral flanges on femurs II, III, IV. Solenidium *sol* on tarsus I subequal in diameter to base of seta *d3* and reaching setae *d4*. Ventral setae on tarsus I with six or seven cilia (longest cilium subequal in length to seta base diameter) along two thirds of length. Six ventral setae on tarsus I, proximoventral seta *v2* present, all of them with 8 or 10 cilia, longest subequal to setal base in diameter. Pretarsi with three claws (central stout claw, lateral slim claws).

Male

As female, except smaller soma, idiosomal length 247 (25, 226–265).

Material examined

Holotype: ♀ (N1988218); soil, litter and sparse moss under ridge-fruited mallee (*Eucalyptus incrassata*) clumps amongst broombush shrubs (*Melaleuca uncinata*), Ferries-McDonald Conservation Park (35°15'S, 139°09'E), 20.vi.1974.

Paratypes: 66 ♀♀ (N1988219–N1988277 and N1989148–N1989154), 40 ♂♂ (N1988278–N1988311 and N1989155–N1989160), same data as holotype; 2 ♀♀, 2 ♂♂ — FMNH; 2 ♀♀, 2 ♂♂ — NZAC.

Distribution

Australia (Aa). South Australia. Mallee-

broombush, open scrubland (Ferries-McDonald Reserve), Murray-Darling basin, 71 ♀ ♀, 44 ♂ ♂ / 7 of 8 × 25 cm².

Remarks

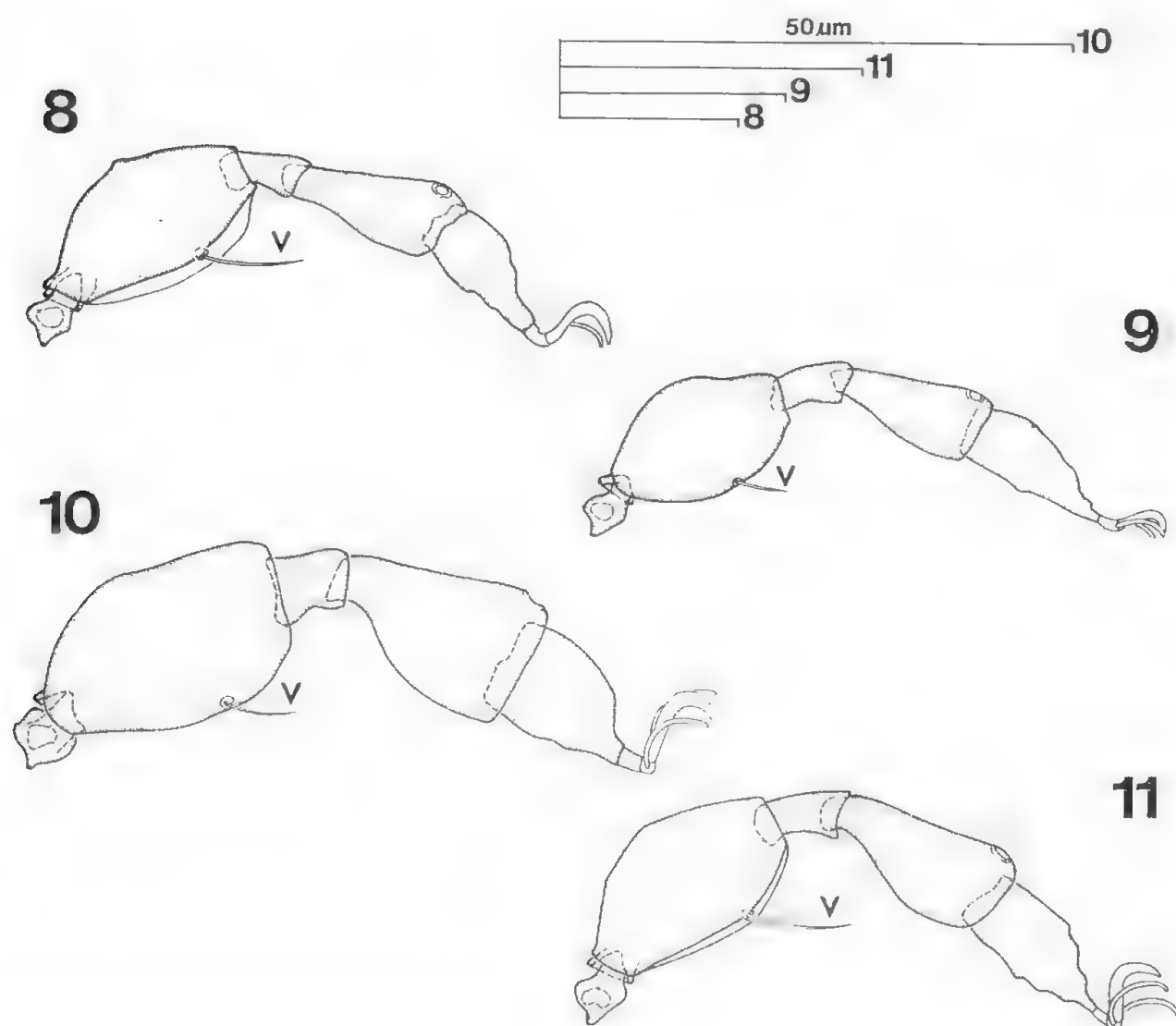
H. rectus is distinguishable from non-Australian species in the nominate subgenus by its smaller size. It has the largest humeral tectum for the genus, which, with the parallel-sided hysteronotum and long interlamellar and lamellar setae, makes it appear similar to some small species of *Scheloribates*. But the humeral tectum in lateral view is substantially smaller than the pteromorphs of *Scheloribates* as is the ventral flange on femur II, although the similarities may reflect a close relationship.

Subgenus *Hemileius* (*Tenuileius*) subgen. nov.

Type species: *Hemileius* (*Tenuileius*) *minimus* sp. nov.

Diagnosis

Hemileius. Hysteronotal seta Z1 distant from anterior margin of hysteronotal shield (distance z2-Z1 subequal to z2-j2). Hysteronotal shield narrow anteriorly with humeral margin strongly tapered, linear and without tectum, so that seta Z2 less than its length from margin. Striated cuticle that separates hysteronotum from ventral shields clearly visible from above, reaching as far forward as seta z2. Pedotectum II extends laterally further than I.



FIGURES 8-11. Right legs II, posterior aspect to femur-pretarsus. 8, *Hemileius* (*Hemileius*) *biclavulus* sp. nov.; 9, *Hemileius* (*Hemileius*) *copectus* sp. nov.; 10, *Hemileius* (*Tenuileius*) *minimus* sp. nov.; 11, *Hemileius* (*Tenuileius*) *paratenuis* sp. nov.

General morphology of Australian species

Colour, shiny yellowish-brown. Smallest species in genus (175–298). Legs short (mean femur-tarsus length: 37–38% of somal length) and tibiae very stout (mean maximum height: 52–59% of mean length). Limbus restricted to margin of hysteronotal shield behind slit-like pore *hf4*, narrow, width about $0.3 \times$ diameter of bothridium. Sacculate foramina with round pores.

Distribution

Currently *Tenuileius* appears to be confined to regions around the Pacific, species being recorded from Australia (Aa), Japan (Pc) and possibly Hawaii (Ap).

Remarks

Tenuileius includes two Australian species in which the hysteronotal shield is strongly tapered anteriorly, with no marginal thickening, and leaving the pleural striated cuticle, which extends unusually well forward, visible from above. Associated with this, seta *Z1* is transposed backwards from the anterior margin of the hysteronotal shield and sometimes towards the mid-line. The anterior narrowing of the hysteronotal shield may have been overlooked in the past since it lies above a region including the highly refractile structures around the sejugal division. Therefore, *H. tenuis* Aoki, 1982 is included in the subgenus on the basis of other similarities to *H. paratenius*. Also, it is noted that whilst *H. gressitti* Balogh & Balogh, 1983 is left in the nominate subgenus, it should be regarded as a potential candidate for inclusion in *Tenuileius* that awaits further examination. As pointed out in the 'Remarks' on the genus, members of this subgenus may be adapted to live in the deeper soil layers. If the adaptations are apomorphic, *Tenuileius* might be better reranked to be a genus. The following three species are grouped in *Hemileius (Tenuileius)*: *H. (T.) minimus* sp. nov., type-species; *H. (T.) paratenius* sp. nov.; *H. (T.) tenuis* Aoki, 1982.

Hemileius (Tenuileius) minimus sp. nov.

Figs 10, 12 and 13

Female

Dorsal hysteronotal profile slim, oval. Idiosomal length, 190 (6, 185–200). Leg lengths (femur-tarsus for idiosomal length 187): I — 82, II — 67, III — 59, IV — 69. Tibial maximum heights (for 187): I — 15, II — 13, III — 12, IV — 12.

Proteronotum with complete prelamella (seta *j1*—rostral margin), costate near *j1*, rest linear. Lamella mainly laminar, linear near *z2*. Sublamella costate, runs close to lamella along anterior half, bothridium (base of seta *z2*) close to lamella.

Subtutorium present, costate, dorsally extending to near seta *z1*. Setae *j1*, *j2*, *z1* inconspicuously ciliate, interlamellar (*j2*) and lamellar (*z1*) setae medium-length, both only reaching level of *z1* and *j1* respectively. Sensory seta short, not reaching *j2*; exposed stalk shorter than caput, caput subglobose (laterally compressed), two ranks of cilia in six or seven files. Seta *s2* length about $2 \times$ diameter of bothridial aperture.

Hysteronotal setae short (but nearly as long as *j2*), subequal in length, peripheral (*J6*, *Z3*, *S6*, *Z6*) setae slightly longer. Slit-like pore *hf3* nearly transverse, adaxial end anterior; *hf4* and *hf5* near lateral margin, visible dorsally, *hf6* partially visible dorsally.

Podosternum with moderately wide gap (slightly less than *II–III*) between apodemes I. Genital shield substantially closer to anal shield than anterior podosternal margin. Adaxial end of apodeme III base latitudinally level with coxite seta *III*, and longitudinally level with coxite seta *IV2*. Custodial ridge present. Discidial ridge with inconspicuous discidium. No circumpedal ridge. Pedotectum II slim, but long, extending laterally beyond pedotectum I. No midcoxite sculpturing. Lateral coxite setae longer than those around mid-line.

Opisthosternum with genital setae evenly spaced and less than half length of anal setae. No eggs observed.

Legs short (mean femur-tarsus length: 37% of soma). Dorsal porose areas not evident on femurs and trachanters. Rugae posteriorly on femurs III and IV. No ventral keels or flanges on femurs. Solenidium *sol* on tarsus I fatter than seta *d3*, reaching pretarsal claws. Six ventral setae on tarsus I, proximoventral seta *v2* present, proximal four with 3 or 4 cilia (longest cilium longer than setal base diameter). Pretarsi with three claws (central stout claw, lateral slim claws).

Male

As female, except soma smaller, idiosomal length, 177 (2, 175–178).

Material examined

Holotype: ♀ (N1988312); sand, litter, under banksia shrubs (*Banksia ornata*), Tamboore Homestead (35°57'S, 140°29'E), 4.viii.1974.

Paratypes: 5 ♀♀ (N1988313–N1988317), 2 ♂♂ (N1988318, N1988319); same data as holotype.

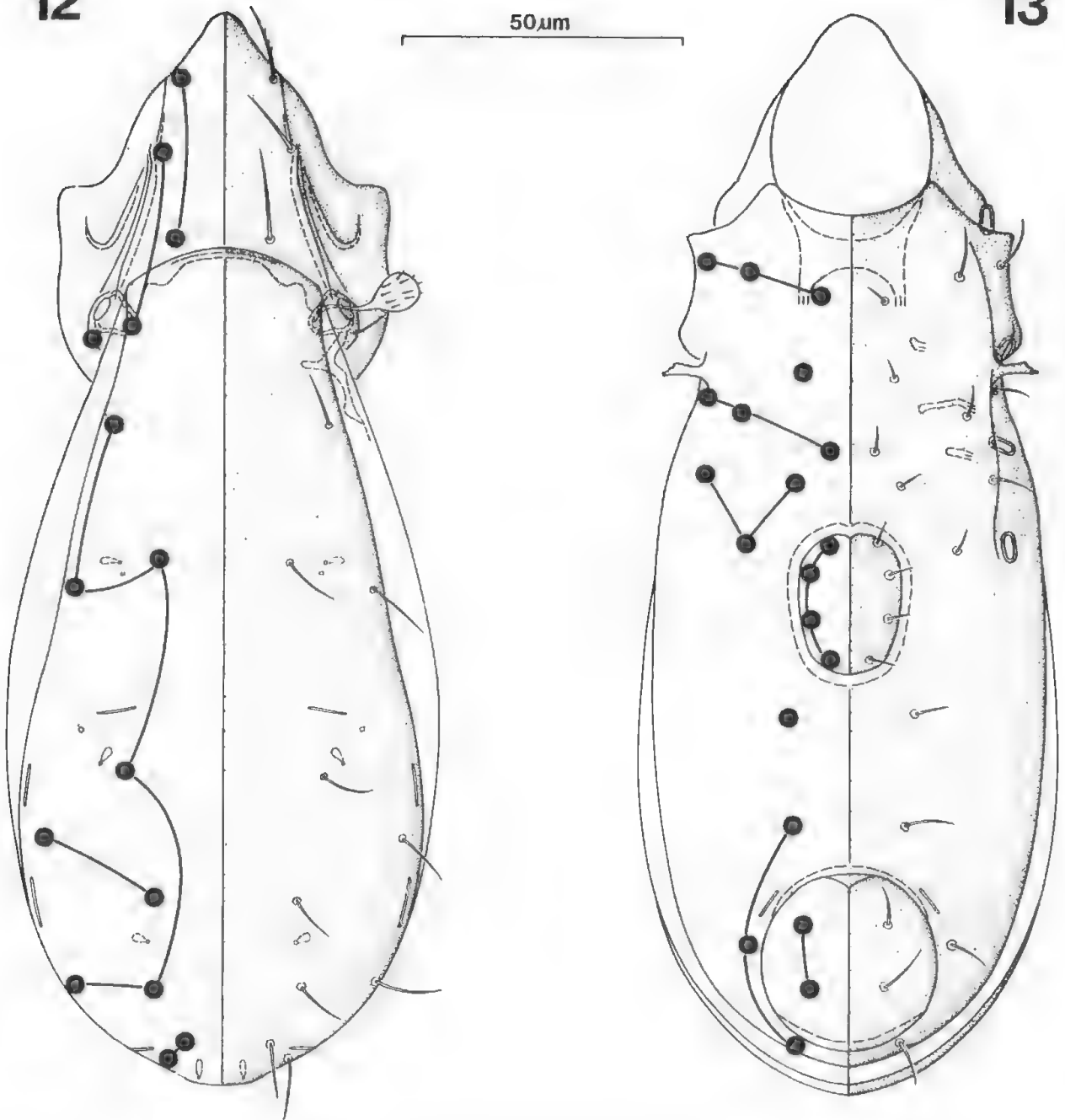
Distribution

Australia (Aa), South Australia. Mallee-heath, tall open shrubland (Tamboore Homestead, near Mt Rescue Conservation Park), Murray-Darling basin, 6 ♀♀, 2 ♂♂ / 1 of 8 $\times$ 25 cm².

12

50 μ m

13



FIGURES 12 AND 13. *Hemileius (Tenuileius) minimus* sp. nov., female soma. 12, notum; 13, idiosternum.

Remarks

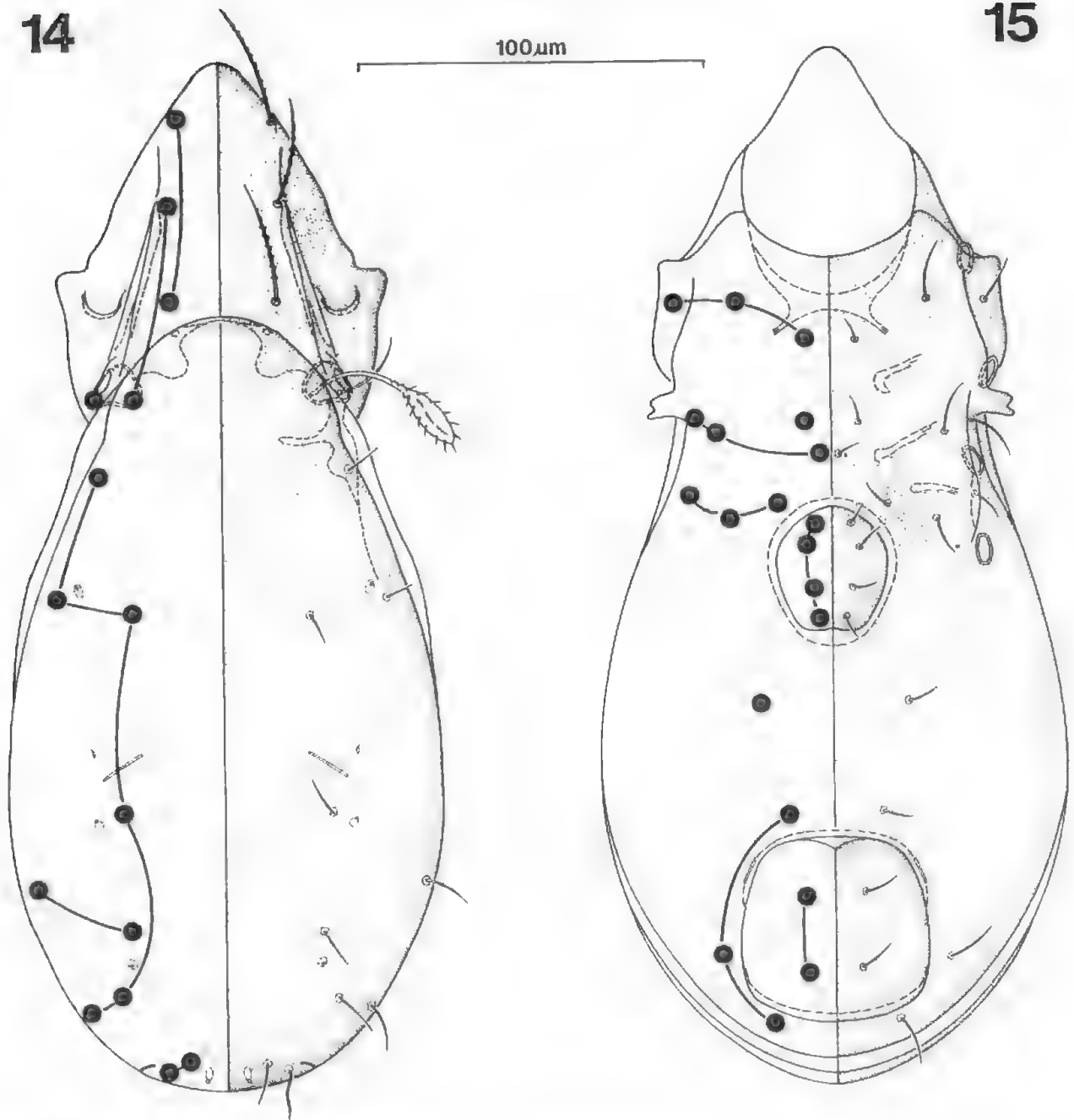
H. (Tenuileius) minimus is the smallest, slimmest species of *Hemileius* so far known. It has a relatively large podosternal region, the shortest legs recorded for *Hemileius*, with short, stout tarsi, and extensive pleural striated cuticle, suggesting adaptation for burrowing, probably in a euedaphic habitat.

Hemileius (Tenuileius) paratenuis sp. nov.

Figs 11, 14 & 15

Female

Dorsal hysteronotal profile oval. Idiosomal length, 296 (3, 293–298). Leg lengths (femur–tarsus for idiosomal length 298): I — 136, II — 108, III



FIGURES 14 AND 15. *Hemileius (Tenuileius) paratenuis* sp. nov., female soma. 14, notum; 15, idiosternum.

— 90, IV — 113. Tibial maximum heights (for 298): I — 23, II — 15, III — 12, IV — 14.

Proteronotum either without prelamella or it is incomplete and lineate (Fig. 14). Lamella mainly laminar, linear near $z2$. Sublamella laminar, runs close to lamella along anterior half, bothridium (base of seta $z2$) close to lamella. Subtutorium present, costate, crescent-shaped. Setae $j1$, $j2$, $z1$ inconspicuously ciliate, interlamellar ($j2$) and lamellar ($z1$) setae medium-length, $j2$ reaching beyond level of $z1$ and $z1$ beyond level of $j1$. Sensory seta ($z2$) medium length, reaching beyond $j2$; exposed stalk longer than caput; caput fusiform,

three files of cilia, median file with 7–8 cilia along caput and stalk, anterior and posterior files with 5–7 cilia confined to caput. Seta $s2$ length about $2.5\times$ diameter of bothridial aperture.

Hysteronotal setae, subequal in length but posterior rank ($J6$, $Z6$, $S6$) longer, sometimes sinuous. Slit-like pore $hf3$ oblique, abaxial end posterior; on right side of one female, longitudinal slit-like pore between setae $Z2$ – $Z3$, presumed $hf2$; $hf4$ and $hf5$ near lateral margin, visible laterally (not illustrated); only half of $hf6$ visible dorsally (Fig. 14).

Podosternum with moderately wide gap (slightly

less than *II-III*) between apodemes I. Genital shield closer to anal shield than anterior podosternal margin. Adaxial end of apodeme III base latitudinally level with point between coxite setae *III-IV1* and longitudinally level with point midway between coxite setae *IV1-IV2*. Custodial ridge present. Discidium forms a shallow flap (depth subequal to diameter of setal base *IV3*). Circumpedal ridge absent. Weak alveolate sculpturing along midcoxite region (Fig. 15, illustrated only on coxite IV). Pedotectum II medium-breadth, long, extending further laterally than pedotectum I.

Opisthosternum with genital setae about two thirds length of anal setae. Genital chaetotaxy very variable, commonest pattern illustrated (Fig. 15), but also 2*JZg*, 3*JZg* and 5*JZg*, missing setae *JZg2* and *JZg3*, extra seta between *JZg3-JZg4*, confined to one side; spacing varies for 4*JZg*, usually even, sometimes central space (*JZg2-JZg3*) extensive so that setae in two groups. No eggs observed.

Legs short (mean femur-tarsus length: 38% of soma). Porose areas on femurs and trochanters III and IV, indistinct rugae on femurs I and II, distinct rugae on femurs III and IV. Keel with shallow flange on femur II. Solenidium *sol* on tarsus I subequal in diameter to base of seta *d3* and reaching to setae *d4*. Five ventral setae on tarsus I, proximoventral seta *v2* absent, only one (*v3*) ciliate, with six or seven cilia (longest cilium subequal in length to setal base diameter) along two-thirds of length. Pretarsi with three claws (central stout claw, lateral slim claws).

Male

As female, except smaller soma, idiosomal length, 273 (5. 262-285).

Material examined

Holotype: ♀ (N1988320); soil, litter and sparse grass under coastal wattle (*Acacia sophorae*), Piccaninnie Ponds Conservation Park (38°03'S, 140°57'E), 3.vii.1974.

Paratypes: 2 ♀♀ (N1988321, N1988322), 5 ♂♂ (N1988323-N1988327), same data as holotype.

Distribution

Australia (Aa). South Australia. Coastal closed-scrubland (Piccaninnie Ponds Conservation Park), SE coastal, 3 ♀♀, 5 ♂♂ / 2 of 8 × 25 cm².

Remarks

H. (Tenuileius) paratenus differs from the other two species of *Tenuileius* in having a fusiform sensory seta (*z2*). It is intermediate in size between these species. In details such as the circular pore to the hysteronotal foramina and presence of lateral coxite setae it resembles *H. (T.) minimus*, whilst in its general broader shape it more closely resembles *H. (T.) tenuis*. It is assumed here that *H. (T.) tenuis* has a narrow hysteronotal shield anteriorly, but this is not commented on in its description (Aoki 1982).

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A REVISION OF THE GENUS PEDIANA SIMON (HETEROPODIDAE: ARANEAE) IN AUSTRALIA

D. B. HIRST

Summary

Australian species of the genus *Pediana* Simon, 1880; *P. horni* (Hogg, 1896), *P. occidentalis* Hogg, 1903, *P. regina* (L. Koch, 1875), type species and *P. tenuis* Hogg, 1903 are revised. Males of those species are described for the first time. Specimens which Thorell, 1881 attributed to *Polydamna* (= *Pediana*) *regina* are not that species. Two groups are recognised.

A REVISION OF THE GENUS *PEDIANA* SIMON (HETEROPODIDAE: ARANEAE) IN AUSTRALIA

D. B. HIRST

HIRST, D.B. 1989. A revision of the genus *Pediana* Simon (Heteropodidae: Araneae) in Australia. *Rec. S. Aust. Mus.* 23(2): 113-126.

Australian species of the genus *Pediana* Simon, 1880; *P. horni* (Hogg, 1896), *P. occidentalis* Hogg, 1903, *P. regina* (L. Koch, 1875), type species, and *P. tenuis* Hogg, 1903 are revised. Males of those species are described for the first time. Specimens which Thorell, 1881 attributed to *Polydamna* (= *Pediana*) *regina*, are not that species. Two groups are recognised.

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The genus *Pediana* has received very little attention in literature apart from the original descriptions of the species. L. Koch (1875) described the first species as *Heteropoda regina* from Queensland. Both Thorell and Simon proposed a new genus for this species. Simon (1880) with *Pediana*, preceded Thorell (1881) who proposed the name *Polydamna* when describing specimens he considered to be *regina* from Yule Is. (the table on p. 698 gives '*Polydora regina*'). Hogg (1896) described *Isopeda horni* from South Australia, which he transferred to *Pediana* in 1903, at the same time describing two new species, *P. occidentalis* and *P. tenuis* from Western Australia.

All were originally described from females, males being unknown in literature except for Thorell's description of the male of *Polydamna regina*. Examination of that male shows that it is not *regina* but a possible new species which requires comparison with *P. aurichelis* Strand, 1907 from Java, the last species added to the genus. Types of the latter are lost (Renner, Stadtliches Museum für Naturkunde, pers. comm.) and the species is not considered here. The male palp of Thorell's specimen is illustrated and the species briefly discussed.

Pediana has remained an obscure genus judging by literature records and Museum collections. Simon (1908) redescribed a specimen correctly attributed to *P. tenuis*, while Strand (1913) gave a description of *P. horni* under the name of *P. regina* (var.?) [neither of those specimens have been examined]. Specimens of *P. tenuis* from Everard Ranges (in the South Australian Museum), were mis-identified as *Isopeda leishmanni* by Rainbow (1915). Many specimens deposited in Museums have been identified as *Isopeda* species, particularly *P. horni* and *P. tenuis*, in which the larger size and similar genitalia shape can be confusing. In the only other discussion of *Pediana*, Mascord (1970) gave brief notes on the genus giving some habitat preferences.

MATERIALS AND METHODS

These notes supplement those given by Hirst (1989). Spination and colour common to all species are given under 'Remarks'. Colour in alcohol is given from recently preserved material. Eye measurements, given as relative to the diameter of an AME, are made on a horizontal plane, except PLE which are on the lateral declivity and measured on a vertical plane. Larger body and leg measurements are taken to the nearest 0.1 mm as most segments required more than one measure using an eyepiece graticule. This problem was compounded by the difficulty in positioning segments of brittle specimens perfectly horizontal for the required accuracy. Abbreviations are: AL = abdomen length, AW = abdomen width, CL = carapace length, CW = carapace width, L = length, W = width. Other abbreviations standard for Araneae. Acronyms: AM — Australian Museum, Sydney; BMNH — British Museum (Natural History), London; BYM — Dr B.Y. Main, Zoology Department, University of Western Australia, Perth; MCG — Museo Civico di Storia Natural 'Giacomo Doria', Genoa; MUZ — Museum Zoologiczne Wroclawskiego, Wroclaw; NMV — Museum of Victoria, Melbourne; NTM — Northern Territory Museum, Darwin; QM — Queensland Museum, Brisbane; SAMA — South Australian Museum, Adelaide; SMNS — Stadtliches Museum für Naturkunde, Stuttgart; WAM — Western Australian Museum, Perth; ZMH — Zoologisches Museum, Hamburg.

Pediana Simon

Pediana Simon, 1880: 258. Type species: *Heteropoda regina* L. Koch 1875, by original designation and monotypy.

Polydamna Thorell, 1881: 299. Type species: *Polydamna regina* by original designation and monotypy. ♂, Penultimate ♀, Yule Island, MCG, examined.

Heteropoda [part] Koch, 1875: 716.

Isopeda [part] Hogg, 1896: 340.

Diagnosis

Carapace about three to four times longer than high. Lateral eyes raised on low common mound. Anterior row recurved, posterior row procurved. MOQ longer than wide. Anterior legs of equal length or leg I subequal to leg II. Abdomen elongate, pointed posteriorly, up to twice as long as wide. Male palp with embolus coiled $2\frac{1}{2}$ –5 times, coil stack wide and of low profile. Palpal tibia with large retrolateral distal apophysis having a dorsal basal ridge.

Description

Medium to large spiders. Two groups are recognised. One contains *P. regina*, *P. occidentalis* and Thorell's species (*regina* group), the other, *P. horni* and *P. tenuis* (*horni* group). Carapace length 3–9 mm (*regina* group) or 6–12 mm (*horni* group), longer than wide, highest posterior to ocular region. ALE largest. PME dome shaped, clearly visible in lateral view. Clypeus $\frac{1}{2}$ to $\frac{3}{4}$ width of AME. Cheliceral groove with two promarginal teeth, three or four retromarginal teeth, rarely five. Labium barely wider than long, with rounded apex. Sternum longer than wide, truncate anteriorly, narrowing from second coxae to a short point posteriorly. Three pairs of ventral spines on tibiae of the *horni* group with distal pair adjacent to articulation with metatarsi. Distal spine pair often absent in the *regina* group. Juveniles of both groups lack the distal pair. Patella IV equal in length to patella III, both may be without retrolateral spines. Scopula on metatarsi IV largely replaced by long bristles. Abdomen up to twice as long as wide (except in gravid females), pointed posteriorly, with pattern of black spots comprised of short adpressed setae which point posteriorly and inwards towards centre line of each spot. Ventrally with two black patches, one posterior to epigastric furrow, the other anterior to spinnerets. The latter patch may be faint or occasionally absent. Male tibial apophysis equal in length to palpal tibia with basal dorsal ridge, pointed apically. Embolus coiled in distal half of cymbium $2\frac{1}{2}$ (*regina* group) or 5 times (*horni* group) with the terminal portion of the embolus resting in groove of a modified loosely spiralled conductor. Coil stack broad at first, then of decreasing width, profile low. Female epigynum large, oblong with somewhat parallel sides to broadly triangular. Fossa large, whitish, slightly translucent often allowing the spermathecae or spermathecal sacs to be seen beneath, slightly concave, smooth except posteriorly, laterally overhung by broad sclerotised lateral rim. Fossa and sclerotised rim lacking setae. Vulva paired,

insemination ducts coiled two to three times (*regina* group) or 5 to 6 times (*horni* group) around spermathecae leading back to adjacent anterior margin of fossa with gentle arc (*horni* group) or with large spermathecal sacs extending to median ventral position (*regina* group) before looping back anterior to fossa, continuing as fertilisation ducts under lateral rims to posterior margin.

Remarks

Mascord (1970) stated *Pediana* was rather shorter in the legs than most huntsman spiders, but this is a visual interpretation affected by the relatively longer abdomen and anterior legs being of equal length. Leg I ratio (leg length divided by carapace length) is comparable with that of many other Australian huntsman spiders particularly *Neosparassus* and some species presently in *Isopeda*. However, leg II of females is relatively shorter than in most other Australian Heteropodidae.

In his key to species included in *Pediana*, Hogg (1903) stated there were no dorsal spines on the posterior tibiae of *P. horni*. This contradicts his original description of one spine on each, which the syntype and other material examined possesses. Tibiae of all species usually with one dorsal spine but *horni* group most often with two on anterior pairs, Thorell's species, while placed here in the *regina* group, has a similar spination to the *horni* group. Usual spination of the *horni* group is as follows: palps, fe d3 pl r1 (all distal), pa pl r1, ti d1 p3 r2 (male r1), ta p3 r variable between 1–3 (male p0 r0); leg I and II, fe d2 p3 r3, pa pl r1, ti d2 p2 r2 v6, me p2 r2 v4; leg III, fe d2 p3 r3, pa pl r1, ti d1 p2 r2 v6, me p2 r2 v4; leg IV, fe d2 p3 r1, pa pl, ti d1 p2 r2 v6, me p4 r4 v4.

The *regina* group as stated above, differs in having one dorsal spine on anterior tibiae (again with the exception of Thorell's species) and often only two spine pairs ventrally on tibiae, lacking the extreme distal pair. This may be represented as a stout bristle, particularly in males, or as a pro-ventral spine on anterior tibiae. Retrolateral patellae spines are usually absent on leg III as well as IV.

Coloration of *Pediana* species is similar. Colour photographs of *P. regina* (in life) can be found in Mascord (1970: 39, Figs 55, 56). Colour in alcohol is paler, of reddish and yellow-brown hues suffused with black. Carapace is reddish-brown, caput darker. Dense adpressed, yellow, orange or whitish setae, interspersed with black. Clumps of black setae often form spots along sides. A thick line of black setae just above postero-lateral margin runs slightly into posterior edge. Black setae around fovea occasionally extend in a line towards caput. Chelicerae reddish, basal half with adpressed white and orange setae. Distal half with erect long setae only. Maxillae and labium blackish, pale anterior

margins. Sternum yellowish to dark brown, margins paler. Legs red-brown proximally to tibia then dark brown or blackish distally to tarsi. Setae similar to carapace, femora ventrally spotted with clumps of white or orange-red setae. Abdomen dorsally yellow-brown to olive-grey with setae as on carapace. Median stripe of black setae usually faint, occasionally vivid. Ventrally yellowish to orange with black spots. Two large black patches, one behind epigastric furrow, the other anterior to spinnerets. Sclerotised area around fossa often bright orange-red.

The tegulum of the unexpanded male palp is largely covered by a disc-shaped embolar base (Fig. 1) where a sclerotised plate, which may be part of the median apophysis, is incorporated. The embolar base in the *regina* group is ridged prolaterally on the distal margin with an indented area proximally to this. A small median apophysis is adjacent to the embolus origin. In the *horni* group the embolar base is larger with a low ridge distally and lacks an indented area proximal to this. A swollen, well-developed median apophysis is somewhat removed from the embolus origin. The embolus itself begins on the retrolateral side. The membranous conductor rises pro-distal from the embolar base in the *regina* group but proximally in the *horni* group.

Distribution (Fig. 11)

Although widespread, these spiders do not appear to be common. *P. regina* is known from the north-east coast of Queensland to southern New South Wales. While *P. horni* is found in arid areas across the centre of the continent, *P. tenuis* is found in the arid areas of Western Australia and western South Australia. *P. occidentalis* is known from semi-arid areas of southern Western Australia. One record of a female from the Flinders Ranges of South Australia is tentatively placed in that species (see later). *P. regina* has a distribution disjunct from the other species, while *P. tenuis* overlaps *P. horni* in the northern part of its range and *P. occidentalis* in Western Australia on the southern part of its range.

KEY TO THE AUSTRALIAN SPECIES OF *PEDIANA*

- 1 —Anterior tibiae usually with 1 dorsal spine and 2 ventral spine pairs. Male with embolus coiled 2½ times 2
 - Anterior tibiae usually with 2 dorsal spines and 3 ventral spine pairs. Male with embolus coiled 5 times 3
- 2 —Venter of abdomen with orange setae. Male embolar base with small median apophysis *regina* (L. Koch)
 - Venter of abdomen with yellow setae. Male embolar base with broad median apophysis *occidentalis* Hogg
- 3 —Anterior femora with white spots. Male with curved dorsal basal ridge on palpal tibial apophysis *horni* (Hogg)
 - Anterior femora with reddish spots. Male with straight-sided dorsal basal ridge on palpal tibial apophysis *tenuis* Hogg

The *Regina* Group

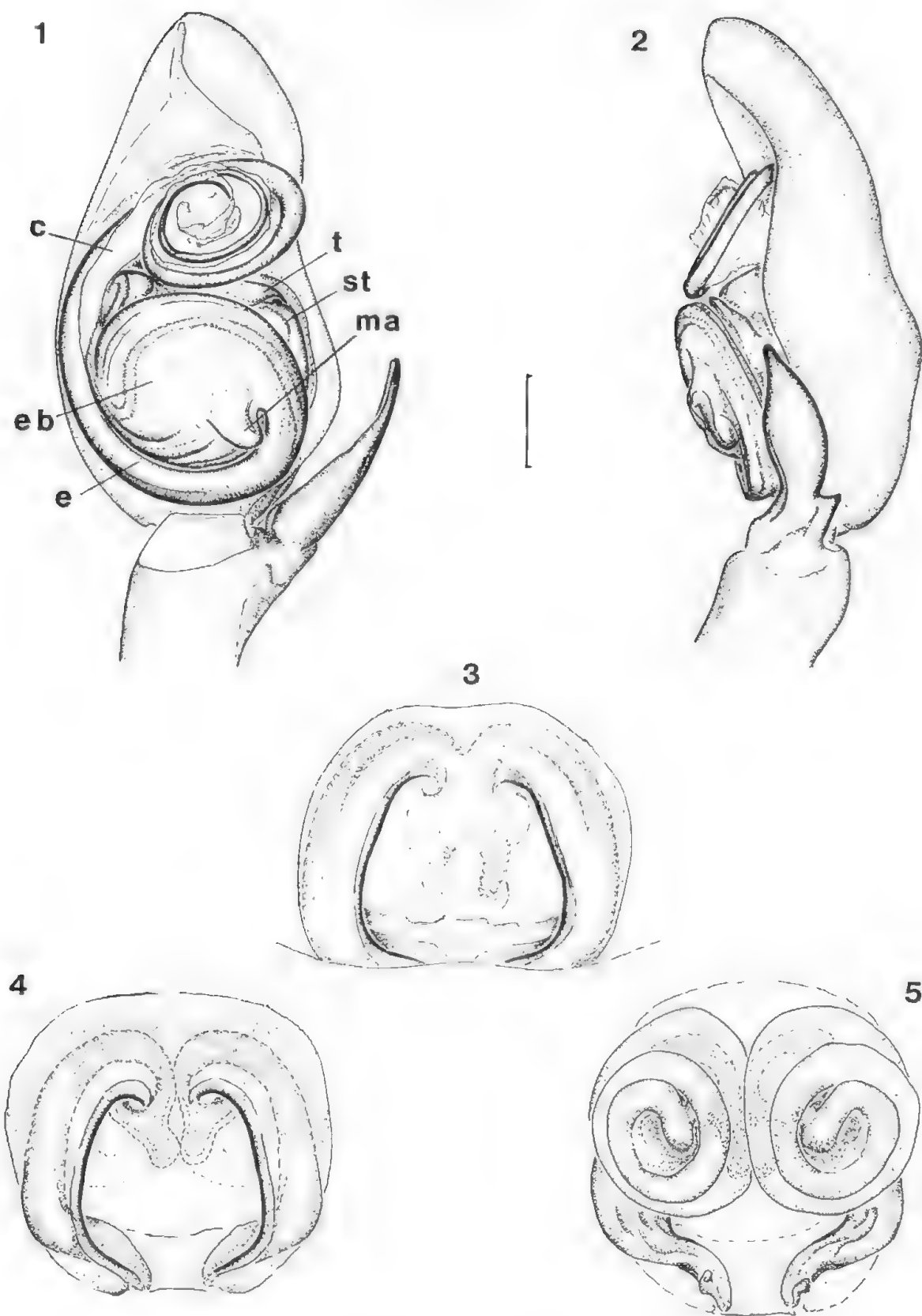
Comprises *P. regina*, *P. occidentalis* and Thorell's species from Yule Island. Males with about 2½ embolar coils, conductor beginning adjacent distal pro-margin of embolar base. Embolar base indented prolaterally, median apophysis small and adjacent origin of embolus. Portion of division between subtegulum and tegulum visible on retrolateral side when viewed ventrally. Females with large spermathecal sacs. Insemination ducts coiled 2–2½ times.

Pediana regina (L. Koch) (Figs 1–5, Table 1)

Heteropoda regina L. Koch, 1875: 716. One of two known syntype females from Peak Downs, Queensland, 22°56'S, 148°05'E, ZMH (Mus. Godeffroy Nr 14602), examined. L. Koch (1875) mentions material from Bowen, Peak Downs and

TABLE 1. Leg measurements of *Pediana regina* (L. Koch) syntype female with male QM S7196 in parentheses.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	8.4 (9.7)	3.6 (3.2)	7.1 (9.5)	7.2 (9.2)	2.3 (2.3)	28.6 (32.9)
II	8.8 (10.1)	3.6 (3.2)	7.5 (10.0)	7.3 (9.3)	2.2 (2.3)	29.4 (34.9)
III	6.7 (7.2)	2.8 (2.2)	5.5 (6.5)	5.1 (5.9)	1.9 (1.8)	22.0 (23.6)
IV	8.0 (9.0)	2.8 (2.2)	6.4 (8.3)	6.9 (9.0)	2.0 (2.1)	26.1 (30.6)
Pa	2.8 (2.4)	1.4 (1.0)	1.7 (1.0)	— —	3.1 (2.8)	9.0 (7.2)



FIGURES 1-5. *Pediana regina* (L. Koch). 1 & 2, left palpal tibia and tarsus of male QM S7196: 1, ventral; 2, retrolateral. 3, epigynum of syntype female. 4 & 5, vulva of SAMA N1988471: 4, ventral; 5, dorsal. Scale line 0.5 mm. c, conductor; e, embolus; eb, embolar base; ma, median apophysis; st, subtegulum; t, tegulum.

Cape York without stating the number of specimens. One female in NMV (K-0873) examined, with the same number (14602) as the syntype above, but with no other data, is a possible syntype. A female from Bowen (not examined) is in the BMNH. The Cape York material, deposited in the Bradley Collection, may have found its way to MUZ (Wrocław) in which case, was probably lost during World War II or possibly is in the Macleay Museum, Sydney, but has not yet been found.
Pediana regina Simon, 1880: 258.

Diagnosis

Anterior femora blackish with white spots, orange-yellow venter of abdomen. Females with broad, triangular-shaped fossa. Male palp with broad tibial apophysis, bulb with small median apophysis.

Syntype female

CL 7.9, CW 7.4, AL 13.2, AW 9.2.

Colour In alcohol: In addition to that under 'Remarks', carapace with orange and white setae, white setae grouped on anterior lateral corner of carapace and on basal half of chelicerae, particularly below boss. Anterior femora ventrally blackish with clumps of white setae. Abdomen yellow-brown laterally with orange spots towards venter. Ventrally with orange setae. May have short transverse mark of brown setae between epigynum and pedicel.

Eyes: AME diameter 0.58; AME:ALE:PME:PLE = 1:1.17:0.83:0.86. Interspaces: AME-AME 0.30, AME-ALE 0.10, PME-PME 1.20, PME-PLE 1.14, AME-PME 1.52, ALE-PLE 1.20. MOQ, anterior width: posterior width: length = 2.62:2.84:3.17. Clypeus half width of AME. Chelicerae: Retromargin of right chelicera with 4 teeth, 5 on left. Labium: L 1.2, W 1.5. Sternum: L 3.9, W 3.5.

Legs (Table 1): Anterior leg ratios = (leg I) 3.6, (leg II) 3.7. Fossa broad posteriorly. Vulva (of SAMA N1988471) with insemination ducts coiled about 2½ times.

Male QM S7196

CL 5.7, CW 5.3, AL 7.0, AW 3.8.

Colour in alcohol: Yellow setae somewhat clustered on anterior half and laterals of carapace. Median cluster of yellow setae on basal half of chelicerae, whitish laterally. Sternum orange-brown suffused with black.

Eyes: AME diameter 0.41. AME:ALE:PME:PLE = 1:1.07:0.85:0.90. Interspaces: AME-AME 0.39, AME-ALE 0.10, PME-PME 1.17, PME-PLE 1.12, AME-PME 1.56, ALE-PLE 1.07. MOQ, anterior width: posterior width: length = 2.00:2.83:3.41. Clypeus equals width of AME.

Chelicerae: Retrolateral teeth 5. Labium: L 0.9, W 1.0. Sternum: L 2.8, W 2.6.

Legs (Table 1): Anterior leg ratios = (I) 5.8, (II) 6.1. Tibial index (leg I) = 7.6.

Palp: Embolus with 2½ coils.

Variation

Carapace length of females range from 5.0–8.5 (n = 23, mean = 6.7). Males: 3.5–6.0 (n = 9, mean = 5.2). Tibial index of Leg I of males: 6.7–9.1 (n = 9, mean = 7.9). Most often with 4 retrolateral cheliceral teeth.

Comments

Thorell's *Polydantina regina* material of one male and a penultimate female from Yule Island, differs from *regina* in its larger size, blackish caput, and less patterned abdomen with yellowish venter. Leg proportions and spination resemble the *horni* group. The male further differs in the apex of the dorsal ridge on the palp tibial apophysis resembling that of *P. horni* (Figs 12–13).

Other material examined

Queensland: 1 ♀, Bell, Darling Downs, 26° 56' S, 151° 27' E, QM S7188; 2 ♂♂, Black Duck Creek, 27° 54' S, 152° 13' E, QM S7214; 1 ♀, Black Mountain, 715° 40' S, 145° 14' E, QM S7191; 1 ♀, Black Mountain, Kuranda area, AM KS20195; 1 ♀, Byfield, 22° 50' S, 150° 38' E, AM KS19724; 1 juv. Calamvale, 27° 37' S, 153° 02' E, QM S7187; 1 ♀, Camira, Brisbane, QM S6563; 1 ♂, Cooloola, 26° 12' S, 153° 05' E, QM S7196; 1 juv. Enfield Station, 27° 06' S, 151° 02' E, QM S7202; 1 ♀, Fanning River Stn, 19° 44' S, 146° 26' E, AM KS19669; 1 ♂, same data, AM KS20203; 1 ♀, Gin Gin, 25° 00' S, 151° 57' E, SAMA N1988471; 1 ♂, Gracemere, 23° 26' S, 150° 27' E, AM KS16650; 1 ♀, Ipswich, 27° 37' S, 152° 47' E, QM S7197; 1 ♀, Koah, 16° 49' S, 145° 31' E, AM KS20196; 1 ♂, Lake Broadwater, 27° 21' S, 151° 06' E, QM S7185; 2 ♀♀, Lake Nuga Nuga, 25° 01' S, 148° 42' E, QM S7215; 1 ♂, Marlaybrook, 26° 54' S, 151° 36' E, QM S7186; 1 ♀, Miriam Vale, 24° 20' S, 151° 34' E, AM KS20197; 1 juv., Mt Coot-tha, 27° 28' S, 152° 58' E, QM S7200; 1 ♂, same locality, QM S7217; 1 ♂, Mt Molloy, 16° 41' S, 145° 20' E, QM S7192; 1 ♂, Mt Nebo, Brisbane, QM S7189; 1 ♂, Nankin Creek, Rockhampton, 23° 24' S, 150° 39' E, AM KS19730; 1 ♂, North Booval, 25° 12' S, 152° 02' E, QM S7216; 1 ♀, Peach Creek, 13° 41' S, 143° 09' E, QM S7193; 1 ♀, Proserpine, 20° 24' S, 148° 35' E, QM S7184; 1 ♂, Rochedale, Brisbane, QM S7190; 1 ♂, same locality, QM S7201; 2 juv. same locality, QM S7203; 1 ♀, Rundle Range, 23° 40' S, 151° 00' E, QM S7199; 1 ♀, The Fork-Mt Moffat area, 25° 04' S, 148° 03' E, QM S6862; 1 ♀, Wynnum, 27° 27' S, 153° 10' E, QM S7194; 1 ♀, Yeppoon, 23° 08' S, 150° 44' E, QM

S7198. New South Wales: 1 ♀, Cessnock, 32°50'S, 151°21'E, AM KS20199; 1 ♀, Jenolan Caves, 33°49'S, 150°02'E, AM KS20193; 1 ♂, 1 ♀, Pittwater, Sydney, AM KS20198; 1 ♀, Sydney, 33°53'S, 151°13'E, AM KS20192; 1 ♀, West Pymble, Sydney, AM KS20194.

***Pediana occidentalis* Hogg**
(Figs 6–10, Table 2)

Pediana occidentalis Hogg, 1903 : 461. Two syntype females, Perth, Western Australia, 31°57'S, 115°51'E, H.W.J. Turner. Pinned specimens in alcohol, BMNH, 1893.7.4.47–100 part, examined.

Diagnosis

From *regina*: femora without black ventrally, abdomen yellowish ventrally. Males with relatively shorter, thicker legs, broader median apophysis and narrower palp tibial apophysis.

Syntype female (largest)

CL 6.6, CW 6.0, AL 8.5, AW 6.0.

Colour in alcohol: Anterior femora reddish-yellow suffused with black but not as darkly as in *regina*. More white setae on carapace. Abdomen yellowish ventrally.

Eyes: AME diameter 0.45, AME:ALE:PME:PLE = 1:1.33:1.00:1.11. Interspaces: AME-AME 0.48, AME-ALE 0.20, PME-PME 1.24, PME-PLE 1.38, AME-PME 1.69, ALE-PLE 1.33. MOQ, anterior width: posterior width: length = 2.44:3.16:3.33. Clypeus equals $\frac{2}{3}$ width of AME. Chelicerae: Retromarginal teeth 3. Labium: L 0.9, W 1.3. Sternum: L 3.3, W 2.8.

Legs (Table 2): Anterior leg ratio = 3.8. Fossa broad posteriorly but relatively narrower than in *regina*. Vulva (of WAM 88/945) with insemination ducts coiled 2–2½ times. Spermathecal sacs may be relatively larger than in *regina*.

Male WAM 88/940

CL 5.8, CW 4.7, AL 5.5, AW 3.3.

Colour in alcohol: With more white setae on lateral edges of carapace and chelicerae. Anterior femora lightly suffused with black, less conspicuous white spots.

Eyes: AME diameter 0.35. AME:ALE:PME:PLE = 1:1.20:0.91:1.09. Interspaces: AME-AME 0.46, AME-PLE 0.06, PME-PME 1.20, PME-PLE 1.14, AME-PME 1.89, ALE-PLE 1.14. MOQ, anterior width: posterior width: length = 2.46:3.03:3.26. Clypeus equals $\frac{3}{4}$ width of AME.

Chelicerae: Left chelicera with 3 retrolateral teeth, 4 on right. Labium: L 0.7, W 0.9. Sternum: L 2.6, W 2.4.

Legs (Table 2): Anterior leg ratios = (I) 4.6, (II) 4.7, Tibial index (leg I) = 9.1.

Palp: Embolus with 2½ coils. Median apophysis broader than in *regina*, tibial apophysis narrower.

Variation

Carapace length of females range from 5.8–6.6 (n = 4, mean = 6.3). Males: 4.6–5.3 (n = 3, mean = 4.9). Tibial index of leg I of males: 9.3–10.6 (n = 3, mean = 9.7). Often with 4 retrolateral cheliceral teeth.

Comments

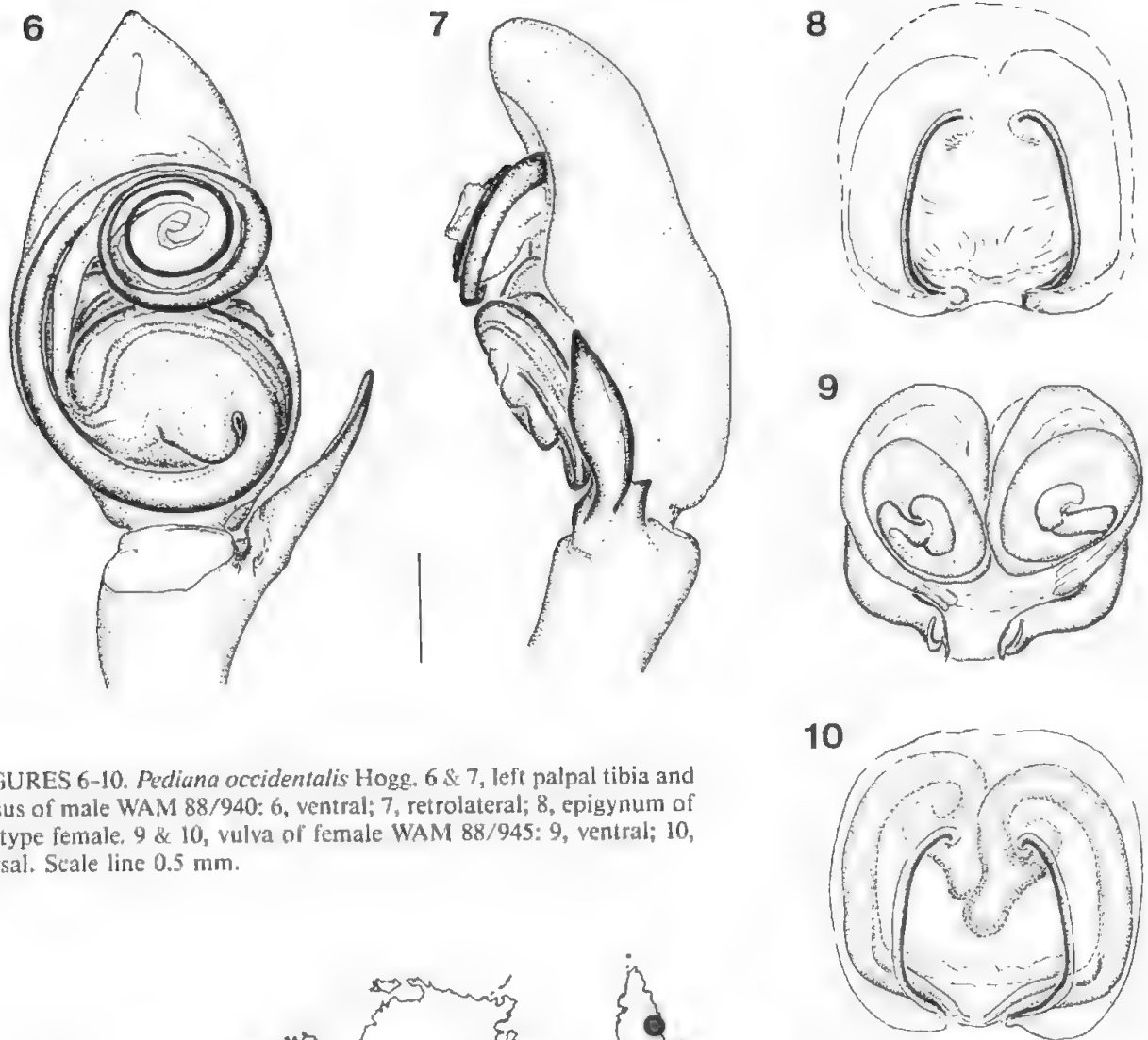
A female from the Flinders Ranges in South Australia is tentatively included in this species although the differences in the epigynum and vulva shape (narrower posteriorly than *occidentalis* with insemination ducts positioned more anteriorly) are comparable with that of *regina* and *occidentalis*. Clarification of this specimen's affinities will remain uncertain until male specimens from the region become available.

Other material examined

Western Australia: 1 ♂, Darlington, 31°55'S, 116°04'E, WAM 88/940; 1 ♂, Goongarrie, 29°55'S, 121°15'E, WAM 88/942; 1 ♀, Mt Pleasant, 33°49'S, 115°50'E, WAM 88/944; 1 ♂,

TABLE 2. Leg measurements of *Pediana occidentalis* Hogg, syntype female (largest) with male WAM 88/940 in parentheses.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	7.5 (7.9)	3.2 (2.7)	6.3 (7.2)	6.2 (7.1)	1.9 (1.9)	25.1 (26.8)
II	7.5 (8.2)	3.2 (2.7)	6.3 (7.6)	6.2 (7.1)	1.9 (1.9)	25.1 (27.5)
III	6.0 (6.2)	2.5 (2.1)	5.0 (5.5)	4.4 (5.0)	1.4 (1.5)	19.3 (20.3)
IV	7.4 (7.8)	2.5 (2.2)	5.8 (6.5)	6.1 (7.4)	1.6 (1.8)	23.4 (25.7)
Pa	2.2 (2.1)	1.1 (0.9)	1.5 (1.0)	—	2.7 (2.5)	7.5 (4.5)



FIGURES 6-10. *Pediana occidentalis* Hogg. 6 & 7, left palpal tibia and tarsus of male WAM 88/940: 6, ventral; 7, retrolateral; 8, epigynum of syntype female. 9 & 10, vulva of female WAM 88/945: 9, ventral; 10, dorsal. Scale line 0.5 mm.

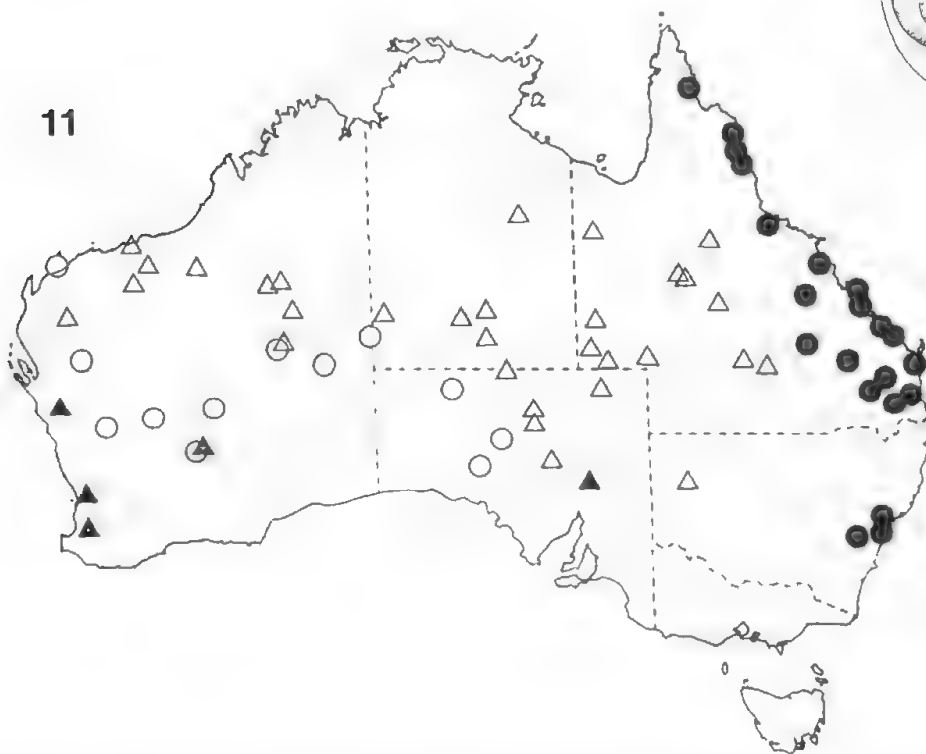
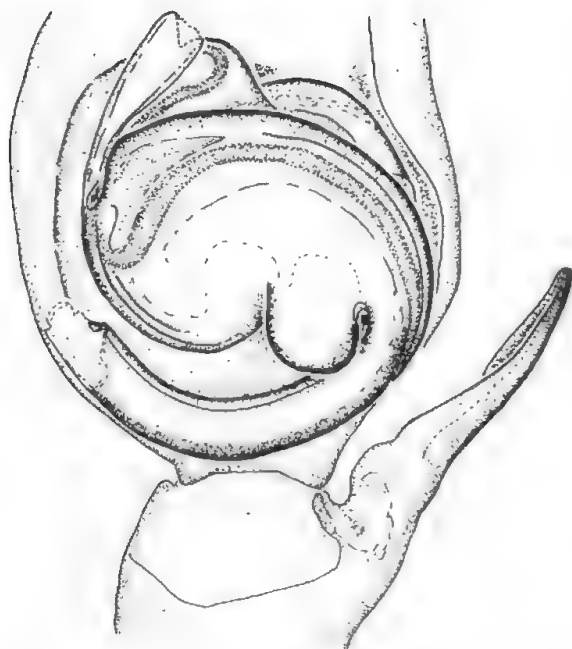
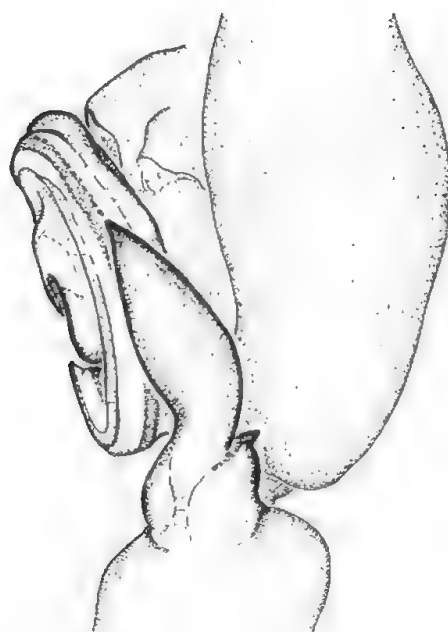


FIGURE 11. Distribution of *Pediana* in Australia: ● *Pediana regina* (L. Koch); ▲ *P. occidentalis* Hogg; ○ *P. horni* (Hogg); Δ *P. tenuis* Hogg.

12

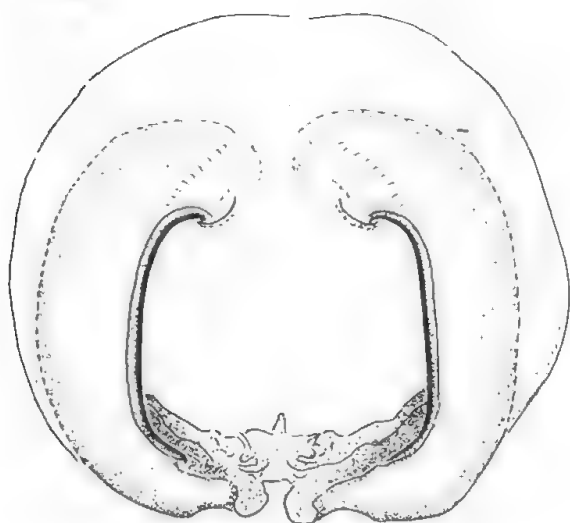


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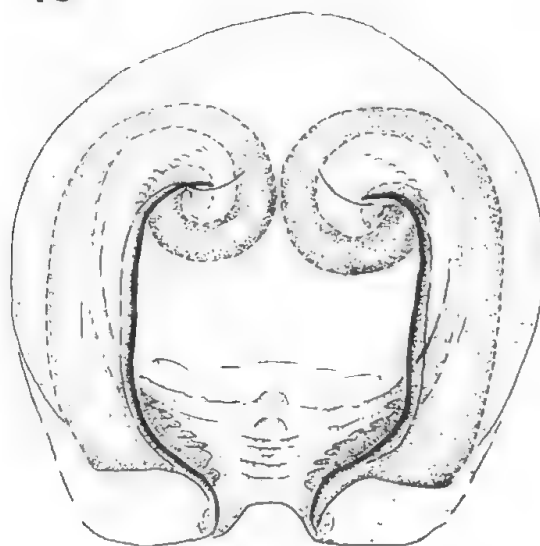


FIGURES 12 & 13. *Polydamma regina* Thorell. Left palpal tibia and tarsus of syntype male: 12, ventral; 13, retrolateral. (Distal part of embolus missing.) Scale line 0.5 mm.

14



15



FIGURES 14 & 15. *Pediana horni* (Hogg). 14, epigynum of syntype female, BM(NH); 15, vulva of female SAMA N1988462, ventral. Scale line 0.5 mm.

Murchison River, ca 27°31'S, 115°43'E, BYM 1962/A22; 1 ♀, Nedlands, 31°59'S, 115°48'E, WAM 88/945; 1 ♀, Walyunga, ca 31°50'S, 116°10'E, AM KS14975. South Australia; 1 ♀, Wilpena Pound, 31°30'S, 139°19'E, SAMA N1988472.

The *Horni* Group

Comprising *P. horni* and *P. tenuis*, this group is characterised in having more numerous long setae (ca 1.5) ventrally on leg four, males with about 5 embolar coils, conductor beginning in the proximal area of the embolar base, embolar base convex prolaterally, median apophysis large and slightly removed from origin of embolus. Females lack spermathecal sacs. Insemination ducts with 5 coils.

Pediana horni (Hogg) (Figs 14-18, Table 3)

Isopeda horni Hogg, 1896: 340. Two syntype females, Oodnadatta, South Australia, 27°33'S, 135°27'E, Horn Expedition, BMNH. 1871.1.18.2 and NMV K-0872, examined.

Pediana horni: Hogg, 1903: 462.

Diagnosis

Anterior femora with conspicuous white spots ventrally, male with curved apical point on dorsal ridge of palp tibial apophysis.

Syntype female BMNH

CL 9.8, CW 9.3, AL 19.5, AW 13.0.

Colour in alcohol: As in Hogg (1903) and above. Eyes: AME diameter 0.64, AME:ALE:PME:PLE = 1:1.16:0.86:0.97. Interspaces; AME-AME 0.47, AME-ALE 0.16, PME-PME 1.09, PME-PLE 1.41, AME-PME 1.47, ALE-PLE 1.19. MOQ, anterior width: posterior width: length = 2.34:2.75:3.03. Clypeus width more than ½ AME. Chelicerae:

Retrolateral teeth 3. Labium: L 1.5, W 1.9. Sternum: L 4.8, W 4.2.

Legs (Table 3): Anterior leg ratio = 3.5.

Fossa with somewhat parallel lateral sides.

Male SAMA N1988458

CL 9.2, W 8.3, AL 9.7, AW 6.0.

Eyes: AME diameter 0.6. AME:ALE:PME:PLE = 1:1.07:0.83:0.93. Interspaces; AME-AME 0.33, AME-ALE 0.13, PME-PME 1.17, PME-PLE 1.27, AME-PME 1.49, ALE-PLE 1.17. MOQ, anterior width: posterior width: length = 2.33:2.83:3.17. Clypeus width ¾ of AME. Chelicerae: Retrolateral teeth 3. Labium: L 1.4, W 1.6. Sternum: L 4.2, W 3.5.

Legs (Table 3): Anterior leg ratio = 4.5. Tibial index (leg I) = 10.3.

Palps: Tibial apophysis with curved apical point on basal ridge. Embolus with 5 coils.

Variation

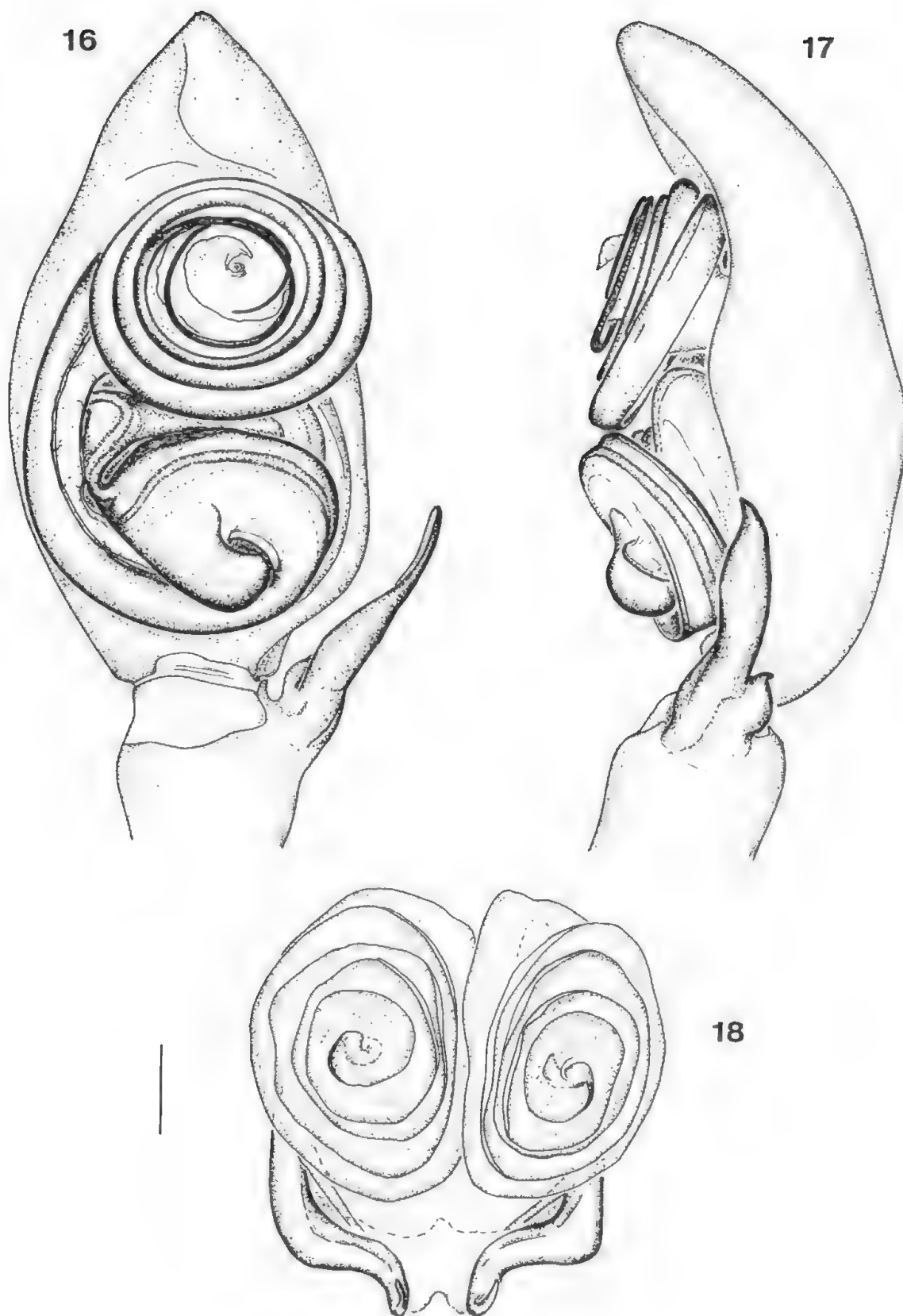
Carapace lengths of females range from 6.1-12.5 (n = 23, mean = 9.5). Males; 6.9-9.8 (n = 5, mean = 8.3). Tibial index of leg I of males; 8.4-10.6 (n = 5, mean = 9.5). A vivid black streak is sometimes present dorsally on the abdomen. Fossa may be slightly wider or narrower posteriorly. Two of four females examined from Ambathala, Queensland, are smallish with decidedly elongated abdomens and relatively smaller epigyne but there is no justification for removing them to another taxa.

Other material examined

South Australia: 1 ♂, Clifton Hills, 27°03'S, 138°59'E, SAMA N1988458; 1 ♀, Finke River, 40 km from Abminga, ca 26°03'S, 135°53'E, AM KS20191; 1 juv. Olympic Dam, 30°27'S, 136°53'E, SAMA N1988463; 1 ♀, The Peake-Mt Denison area, 28°09'S, 135°57'E, SAMA N1988461; 1 ♀, Road to Oodnadatta, 28°35'S, 135°53'E, SAMA N1988462. **Western Australia:** 2 juv. Canning Stock Route, 22°32'S, 124°24'E, WAM 88/1483-4; 1 juv.

TABLE 3 Leg measurements of *Pediana horni* (Hogg) syntype female BM(NH), with male SAM N1988458 in parentheses.

Leg	Femur	Patella	Tibia	Métatarsus	Tarsus	Total
I	10.3 (12.0)	4.6 (4.6)	8.3 (11.0)	8.3 (10.9)	2.5 (2.9)	34.0 (41.4)
II	10.3 (12.0)	4.5 (4.5)	8.4 (11.1)	8.3 (10.9)	— (2.9)	— (41.4)
III	7.7 (9.0)	3.7 (3.6)	6.3 (7.9)	5.4 (7.1)	2.2 (2.2)	25.3 (29.8)
IV	9.8 (11.7)	3.5 (3.5)	7.5 (9.7)	8.3 (10.8)	— (2.5)	— (38.2)
Pa	3.6 (3.5)	1.8 (1.4)	2.2 (1.6)	— —	3.4 (4.0)	11.0 (10.5)



FIGURES 16-18. *Pediana horni* (Hogg). 16 & 17, right palpal tibia and tarsus of male SAMA N1988458 (reversed drawing): 16, ventral; 17, retrolateral. 18, vulva of female SAMA N1988462, dorsal. Scale line 0.5 mm.

same locality but 22°20'S, 124°45'E, WAM 88/1485; 1 ♀, Lower Carawine Gorge, 21°29'S, 121°02'E, WAM 88/1485; 1 ♀, Mundabullagana Station, 20°31'S, 118°04'E, SAMA N1988468; 1 ♀, Windy Corner, 23°34'S, 125°12'E, WAM 88/2905; 1 ♀, Wittenoom, 22°14'S, 118°20'E, WAM 88/1493; 1 ♀, Woodstock Station, 21°37'S, 118°57'E, WAM 88/2133; 1 ♀, same locality but 21°36' 34"S, 118°58' 28"E, WAM 88/2533; 1 ♂, same locality but 21°36' 40"S, 119°02' 23"E, WAM 88/2132; 1 ♂, same locality, WAM 88/2133. **Northern Territory:** 1 ♀, Alice Springs, 23°42'S, 133°52'E, NTM A52; 1 ♀, Frewena Road House, 19°25'S, 135°24'E, NTM; 1 ♀, Hermannsburg, 23°57'S, 132°46'E, SAMA N1988465; 1 ♂, Idracowra Station, 25°00'S, 133°47'E, SAMA N1988464; 1 ♀, Ligertwood Cliffs, 23°39'S, 129°30'E, WAM 88/1494. **Queensland:** 1 ♀, Ambathala, 25°58'S, 145°19'E, QM S7174; 1 ♀, same locality, QM S7176; 1 ♀, same locality, QM S7219; 1 ♀, same locality, QM S7220; 2 ♀ ♀, Betoota (45 km E of), ca 25°45'S, 141°10'E, QM S7183; Eggsac and first instars, same locality, QM S7218; 1 ♂, Charleville, 26°24'S, 146°15'E, QM S7221; 1 ♀, Dunraven Station, 20°28'S, 143°57'E, QM S7180; 1 ♀, Lake Munoonie, 25°12'S, 138°40'E, QM S7182; 2 juv. same locality, QM S7178; 1 juv. same locality, QM S7181; 1 ♀, Longreach, 23°27'S, 144°15'E, QM S7179; 1 ♀, Montara Bore, Sandringham Stn, 23°56'S, 138°47'E, AM KS15282; 1 ♀, Mt Munro, 22°13' 50''S, 142°28' 50 ''E, QM S7175; 1 ♀, Split Rock, Camooweal, 19°54'S, 138°39'E, AM KS20200; 1 ♀, Winton, 22°23'S, 143°02'E, QM S7177. **New South Wales:** 2 ♀ ♀, Springs Creek, 31°43'S, 142°41'E, SAMA N1988466-7.

Pediana tenuis Hogg
(Figs 19-22, Table 4)

Pediana tenuis Hogg, 1903: 462. Simon, 1908: 441. Holotype female, dried specimen, Western Australia [BMNH] lost.

Diagnosis

P. tenuis can be distinguished from *P. horni* by the presence of reddish setae in place of white on the anterior femora pro-ventrally. Males with relatively longer, thinner legs and straight-edged, triangular-shaped apex on dorsal basal ridge of palp tibial apophysis.

Female WAM 88/958

CL 8.5, CW 7.4, AL 16.9, AW 9.5.

Colour in alcohol: Similar to *P. horni* but carapace dark red-brown with more white than yellow setae. Black setae may be more numerous. Dark blackish-brown setae on sternum. Coxae orange-brown, prolaterally black-brown. Legs reddish-brown, dark brown-black patches. Femora retro-dorsally blackish occasionally forming a dark stripe. Clumps of reddish setae pro-ventrally on anterior pairs, whitish setae in clumps on posterior pairs. Abdomen green-grey with a black median streak and black spots formed of setae. Ventrally with orange setae.

Eyes: AME diameter 0.54, AME:ALE:PME:PLE = 1: 1.33: 0.93: 1.04. Interspaces; AME-AME 0.41, AME-ALE 0.15, PME-PME 1.11, PME-PLE 1.48, AME-PME 1.55, ALE-PLE 1.30. MOQ, anterior width: posterior width: length = 2.41: 2.91: 3.15. Clypeus more than half diameter of AME. Chelicerae: Retrolateral teeth 3. Labium: L 1.3, W 1.6, Sternum: L 3.9, W 3.3.

Legs (Table 3): Anterior leg ratio = 3.7.

Epigynum similar to *horni* but fossa relatively narrower posteriorly.

Male WAM 88/957

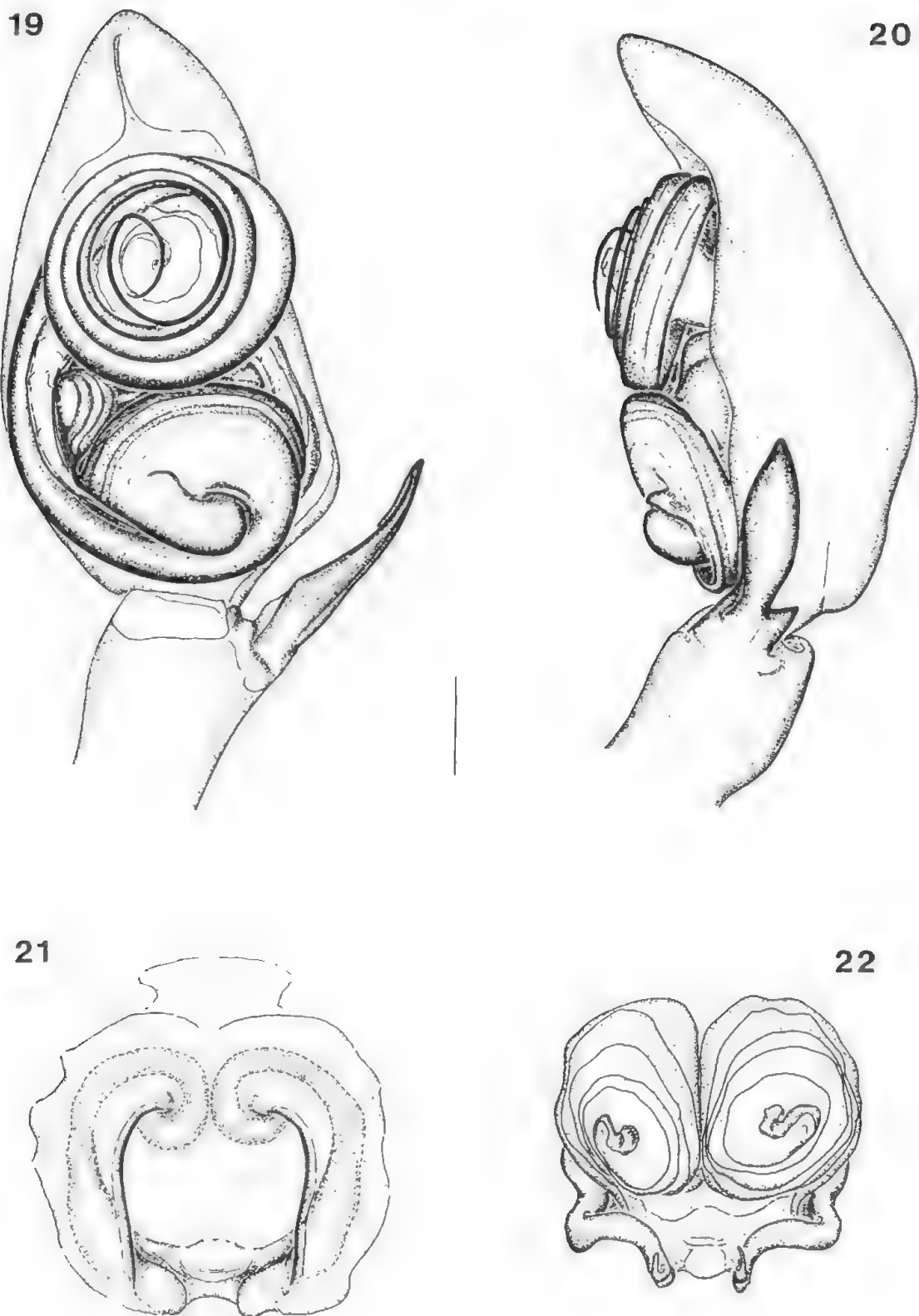
CL 7.3, CW 6.5, AL 9.0, AW 4.5.

Colour in alcohol: Paler than female. Venter of abdomen with smaller faint brown patches behind epigastric furrow and anterior to spinnerets.

Eyes: AME diameter 0.50, AME:ALE:PME:PLE = 1:1.24:0.90:1.00. Interspaces; AME-AME 0.24, AME-ALE 0.04, PME-PME 0.96, PME-PLE 1.24, AME-PME 1.56, ALE-PLE 1.00. MOQ, anterior width: posterior width: length = 2.24: 2.76: 3.20.

TABLE 4. Leg measurements of *Pediana tenuis* Hogg, female WAM 88/958 with male WAM 88/957 in parentheses.

Leg	Femur	Patella	Tibia	Metatarsus	Tarsus	Total
I	9.4 (12.9)	3.9 (4.2)	7.8 (12.1)	8.1 (12.6)	2.2 (2.9)	31.4 (44.7)
II	9.5 (12.9)	3.8 (4.2)	7.9 (12.0)	8.0 (12.7)	2.2 (2.9)	31.4 (44.7)
III	7.0 (9.1)	3.1 (3.0)	5.8 (7.9)	5.0 (7.3)	1.9 (2.1)	22.8 (29.4)
IV	9.2 (12.1)	3.1 (3.0)	7.0 (10.0)	7.8 (11.9)	2.2 (2.6)	29.3 (39.6)
Pa	3.1 (3.1)	1.6 (1.3)	1.8 (1.5)	— —	3.1 (3.3)	9.6 (9.2)



FIGURES 19-22. *Pediana tenuis* Hogg. 19 & 20, left palpal tibia and tarsus of male WAM 88/957: 19, ventral; 20, retrolateral. 21 & 22, vulva of female WAM 88/958: 21, ventral; 22, dorsal. Scale line 0.5 mm.

Clypeus half width of AME. Chelicerae: Retrolateral teeth 3. Labium: L 1.1, W 1.2. Sternum: L 3.4, W 2.8.

Legs (Table 4): Anterior leg ratio = 6.1. Tibial index (leg I) = 7.4.

Palps: Triangular-shaped dorsal basal ridge on tibial apophysis. Embolus with 5 coils. Median apophysis smaller than in *horni*.

Variation

Carapace lengths of females range from 6.6–10.5 (n = 11, mean = 8.8). Males: 6.6–7.3 (n = 3, mean = 7.0). Tibial index of leg I of males: 7.4–9.2 (n = 3, mean = 9.7). Epigynum parallel-sided and, as in *horni*, often slightly wider or narrower towards posterior but several specimens of *tenuis* examined are considerably narrower posteriorly (Fig. 21).

Comments

As this species is recognisable from Hogg's description, designation of a neotype is unnecessary.

Material examined

Western Australia: 1 ♂, Banjiwarn, 27°48'05"S., 121°40'05"E., WAM 88/957; 1 P♂, Charles Knob, 25°03'S., 124°59'E., WAM 88/1486; 1 ♀, Coordewandy, 25°36'S., 115°58'E., WAM 88/1487; 1 ♀, Gill Pinnacle, 24°54'S., 128°46'E., SAMA N1988469; 1 ♀, Goongarrie, 29°55'25"S., 121°14'35"E., WAM 88/958; 1 ♀, Lyndon Station, 23°38'S., 15°14'E., WAM 88/1488; 1 ♀, Messengers Patch, 28°41'S., 116°57'E., WAM 88/1489; 2 ♂♂, Thevenard Island, 21°28'S., 114°59'E., WAM 88/2012-3; 1 ♀, Warburton Ranges, 26°06'S., 126°39'E., WAM 88/1490; 1 ♀, same locality, SAMA N1988470; 2 juv. same locality but N.W. of, 25°10'S., 124°40'E., WAM 88/1491-2; 1 ♀, Yuinmery, 28°32'00"S., 119°05'45"E., WAM

88/2110. **South Australia:** 1 ♀, Flat Rock Hole, Everard Ranges, 27°06'S., 132°26'E., SAMA N1985179; 1 ♀, Lake Phillipson, 29°28'S., 134°27'E., SAMA N1988460; 1 ♀, Wynbring, 30°34'S., 133°32'E., SAMA N1988459.

Subfamily placement

Pediana was originally placed by Simon (1897) in his Heteropodeae (= Heteropodinae) on the criteria of its longer than broad ocular quadrangle. Hogg (1903) included it in his Delenaeae (= Deleninae) with other Australian genera based largely on male genitalia structure. Simon (1903) enlarged the Deleninae subfamily, including many more genera. Jarvi (1914) restricted the Deleninae again to Australian genera but Petrunkevitch (1928) included the subfamily in the Eusparassinae Jarvi, 1912. Gravelly (1931) recognised the Deleninae but also included genera from both Petrunkevitch's Eusparassinae and Micrommatinae (Jarvi 1912). Finally, Hirst (1989) restricted the genera of Deleninae to those originally included by Hogg, one of which was *Pediana*.

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A LIST OF AUSTRALIAN ACANTHOCEPHALA AND THEIR HOSTS

S. J. EDMONDS

Summary

A list of Acanthocephala known from Australia and their hosts is given and records are included.

A LIST OF AUSTRALIAN ACANTHOCEPHALA AND THEIR HOSTS

S. J. EDMONDS

EDMONDS, S. J. 1989. A list of Australian Acanthocephala and their hosts. *Rec. S. Aust. Mus.* 23(2): 127-133.

A list of Acanthocephala known from Australia and their hosts is given and records are included.

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Although during the 1980s two checklists were published that contained references to Australian Acanthocephala, one (Beumer *et al.* 1982) on the parasites of Australian fishes and the other (Mawson *et al.* 1986) on the parasites of Australian birds, no complete list of parasites and hosts of Australian Acanthocephala has appeared since that of Johnston & Deland (1929). In the meantime new species have been described, new records published and changes made to the systematics and nomenclature of the phylum. The aim of the present paper is to bring up to date as far as is possible information about the Australian species.

The scheme of classification followed is that outlined by Amin (1985), which is based on the Meyer-Van Cleave taxa, Archiacanthocephala, Palaeacanthocephala and Eoacanthocephala.

Specimens of many of the species are to be found in the Australian Helminthological Collection, now housed in the South Australian Museum, Adelaide, South Australia. The location of some type material is given in Smales (1983).

The following abbreviations are used in the paper; N.S.W. (New South Wales), Q. (Queensland), V. (Victoria), T. (Tasmania), S.A. (South Australia), W.A. (Western Australia), N.T. (Northern Territory).

PARASITES AND HOSTS

Class ARCHIANCANTHOCEPHALA

Gigantorhynchidae

1. *Mediorhynchus alecturae* (Johnston & Edmonds, 1947)
Echinorhynchus (Gigantorhynchus) sp. Johnston, 1912a: 106; Johnston & Deland, 1929a: 148.
Empodius alecturae Johnston & Edmonds, 1947b: 557-561, Figs 11-21.
Mediorhynchus alecturae; Golvan, 1962: 29; Byrd & Kellogg, 1971: 137-142.
Host: *Alectura lathamii* Gray.
Locality: Q.

2. *Mediorhynchus corcoracis* (Johnston & Edmonds, 1951)

Echinorhynchus sp. Johnston & Deland, 1929a: 151.
Mediorhynchus corcoracis Johnston & Edmonds, 1951: 1-3, Figs 2-9; Yamaguti, 1963: 117.

Hosts: *Corcorax melanorhamphos* (Vicillot), *Corvus tasmanicus* Mathews, *Corvus mellori* Mathews, *Corvus hennetti* North.

Localities: N.T., Q., N.S.W., V., T., S.A.

Moniliformidae

3. *Moniliformis moniliformis* (Bremser, 1811)
Echinorhynchus moniliformis Bremser, 1811: 1-31.
Moniliformis moniliformis: Travassos, 1915: 377; Johnston, 1909: 583; 1912b: 83; Southwell & Macfie, 1925: 171; Johnston & Deland, 1929a: 147.

Moniliformis dubius: Johnston & Edmonds, 1952: 20-21, Figs 8-9; Amin, 1985: 33.

Hosts: *Rattus rattus* (Linnaeus), *R. norvegicus* (Berkenhout), *R. fuscipes* (Waterhouse).

Localities: Q., N.T., N.S.W., S.A.

4. *Australiformis semoni* (Linstow, 1898)
Echinorhynchus semoni Linstow, 1898: 468.
Moniliformis semoni: Johnston & Edmonds, 1952: 18-20, Figs 10-17; Yamaguti, 1963: 132.
Australiformis semoni: Schmidt & Edmonds, 1989: 215-217.

Hosts: *Isodon obesulus* (Shaw), *I. macrourus* (Gould), *Perameles gunni* Gray, *P. nasuta* Geoffroy.

Localities: Q., N.S.W., V., T.

Oligacanthorhynchidae

5. *Macracanthorhynchus hirudinaceus* (Pallas, 1781)
Taenia hirudinaceus Pallas, 1781: 39.
Macracanthorhynchus hirudinaceus: Travassos, 1917: 1-61; Johnston & Deland, 1929a: 147; Yamaguti, 1963: 141.
Host: *Sus scrofa* Linnaeus.
Localities: Q., N.S.W., V., S.A.

6. *Oncicola pomatostomi* (Johnston & Cleland, 1912)

Echinorhynchus pomatostomi Johnston & Cleland, 1912: 111-114, Figs 1-4; Johnston & Deland, 1929a: 149-151; Yamaguti, 1963: 139.

Oncicola sp. Banks, 1952: 108; Edmonds, 1957a: 79. *Oncicola pomatostomi*; Schmidt, 1983: 379-399, Figs 1-6.

Intermediate host: not known.

Paratenic hosts: especially in the tissues of the neck of the following birds: *Turnix castanota* (Gould), *T. velox* (Gould), *Pedionomus torquatus* Gould, *Anthus novaeseelandiae* (Gmelin), *Lalage leucomela* (Vigors & Horsfield), *Zoothera dauma* (Latham), *Melanodryas cucullata* (Latham), *Microeca leucophaea* (Latham), *Oreoleca gutturalis* (Vigors & Horsfield), *Cinclosoma castanotum* Gould, *C. cinnamomeum* Gould, *Pachycephala inornata* Gould, *P. rufiventris* (Latham), *Colluricincla harmonica* (Latham), *Pomatostomus temporalis* (Vigors & Horsfield), *P. superciliosus* (Vigors & Horsfield), *P. ruficeps* (Hartlaub), *Amytornis purnelli* Mathews, *Sericornis pyrrhopygus* (Vigors & Horsfield), *S. cautus* (Gould), *S. brunneus* (Gould), *S. fuliginosus* (Vigors & Horsfield), *Acanthiza chrysorrhea* (Quoy & Gaimard), *Aphelocephala leucopsis* (Gould), *Daphoenositta chrysoptera* (Latham), *Climacteris leucophaea* (Latham), *C. picumnus* Temminck, *C. melanura* Gould, *Anthochaera carunculata* (White), *Manorina flavigula* (Gould), *Lichenostomus virescens* (Viellot), *L. plumulus* (Gould), *Poephila cincta* (Gould), *Grallina cyanoleuca* (Latham), *Artamus superciliosus* (Gould), *Gymnorhina tibicen* (Latham).

Definitive hosts: feral cats (*Felis catus* Linnaeus), dingo (*Canis familiaris dingo* Blumenbach).

Localities: Q., N.S.W., S.A., W.A., V., N.T.

Class PALAEACANTHOCEPHALA

Arhythmacanthidae

7. *Heterosentis paraplagusiarum* (Nickol, 1972)
Arhythmacanthus paraplagusiarum Nickol, 1972: 778-780, Figs 1-5.

Heterosentis paraplagusiarum: Amin, 1985: 39.

Host: *Paraplagusia guttata* Macleay.

Locality: Q.

Diplosentidae

8. *Pararhadimorhynchus mugilis* Johnston & Edmonds, 1947

Pararhadimorhynchus mugilis Johnston & Edmonds, 1947a: 15-17, Figs 10-17; Edmonds, 1973: 21, Figs 6 & 7.

Host: *Mugil cephalus* Linnaeus.

Locality: S.A.

9. *Pararhadimorhynchus coorongensis* Edmonds, 1973

Pararhadimorhynchus coorongensis Edmonds, 1973: 19-21, Figs 1-5.

Host: *Aldrichetta forsteri* (Cuvier & Valenciennes).

Locality: S.A.

Echinorhynchidae

10. *Acanthocephalus crinia* Snow, 1971

Acanthocephalus crinia Snow, 1971: 145-149, Figs 1-5.

Hosts: *Crinia tasmaniensis* (Gunther), *C. signifera* Girard, *C. laevis* (Gunther).

Locality: T.

11. *Acanthocephalus hastae* Baylis, 1944

Echinorhynchus truttae: Southwell & Macfie, 1925: 180.

Echinorhynchus clavula: Southwell & Macfie, 1925: 180.

Acanthocephalus hastae Baylis, 1944: 463-466, Fig 1.

Host: *Pomadasys hasta* (Bloch).

Locality: Q.

12. *Pseudocanthocephalus perthensis* Edmonds, 1971

Pseudocanthocephalus perthensis Edmonds, 1971: 55, Figs 1-5.

Hosts: *Litorea moorei* (Copeland), *Limnodynastes dorsalis* Gray.

Locality: W.A.

Hypoechinorhynchidae

13. *Hypoechinorhynchus alaeopis* Yamaguti, 1939
Hypoechinorhynchus alaeopis Yamaguti, 1939: 317-351; Johnston & Edmonds, 1947a: 13-15, Figs 1-9; Yamaguti, 1963: 56.

Host: *Callionymus calauropomus* Richardson.
Pseudolabrus tetricus Richardson

Locality: S.A.

Illiosentidae

14. *Tegorhynchus edmondsi* (Golvan, 1960)
Illiosentis furcatus: Edmonds, 1957b: 94-95, Figs 2 & 3.

Illiosentis edmondsi Golvan, 1960: 159; Golvan, 1969: 21.

Tegorhynchus edmondsi: Amin, 1985: 47.

Host: *Upeneichthys porosus* (Cuvier & Valenciennes).

Locality: W.A.

15. *Telosentis australiensis* Edmonds, 1964

Telosentis australiensis Edmonds, 1964: 41-43, Figs 1-5.

Host: *Anguilla reinhardtii* Steindachner

Locality: Q.

Pomphorhynchidae

16. *Longicollum edmondsi* Golvan, 1969
Longicollum pagrosomi: Johnston & Edmonds, 1951: 1-3, Figs 2-9.
Longicollum edmondsi, Golvan, 1969: 321-322.
 Host: *Acanthopagrus butcheri* (Monro).
 Locality: Q., S.A.

Rhadinorhynchidae

17. *Australorhynchus tetramorphacanthus* Lebedev, 1967
Australorhynchus tetramorphacanthus Lebedev, 1967: 279-282, Figs 1-2.
 Hosts: *Seriola grandis* Castelnau, *Trachurus novaezelandiae* Quoy & Gaimard, *Paratrigla papilio* Cuvier & Valenciennes.
 Locality: Tasman Sea; Great Australian Bight.
18. *Gorgorhynchus celebesensis* (Yamaguti, 1954)
Rhadinorhynchus celebesensis Yamaguti, 1954: 407, Fig. 1.
Gorgorhynchus celebesensis Golvan, 1969: 10; Hooper, 1983: 22.
 Hosts: *Platycephalus bassensis* (Cuvier), *P. richardsoni* Castelnau, *P. fuscus* Cuvier, *P. arenarius* Ramsay & Ogilvy, *P. longispinis* Macleay.
 Locality: N.S.W.
19. *Microcanthorhynchina hemirhamphi* Baylis, 1944
Micracanthocephalus hemirhamphi Baylis, 1944: 422-426, Fig. 1: Johnston & Edmonds, 1952: 17-18; Edmonds, 1957b: 96; Nickol, 1972: 778-780.
 Host: *Reporhamphus melanochir* Cuvier & Valenciennes.
 Localities: S.A., T.
20. *Paracanthorhynchus galaxiasus* Edmonds, 1967
Paracanthorhynchus galaxiasus Edmonds, 1967: 41-44, Figs 1-6.
 Host: *Galaxias attenuatus* (Jenyns).
 Locality: S.A.
21. *Sclerocollum robustum* (Edmonds, 1964)
Neogorgorhynchus robustus Edmonds, 1964: 43-45, Figs 6-9.
Sclerocollum robustum: Schmidt & Paperna, 1978: 846.
 Host: *Siganus lineatus* (Cuvier & Valenciennes).
 Locality: Q.
22. *Rhadinorhynchus bicircumspinus* Hooper, 1983
Rhadinorhynchus bicircumspinus Hooper, 1983: 23-26, Figs 8a-8c.
 Host: *Platycephalus bassensis* (Cuvier).
 Locality: N.S.W.

23. *Rhadinorhynchus carangis* Yamaguti, 1939
Rhadinorhynchus carangis Yamaguti, 1939: 341.
Nipporhynchus carangis: Edmonds, 1982: 71-73, Figs 1-3; Amin, 1983: 51.

Host: *Trachinotus russelli* (Cuvier).
 Locality: Q.

24. *Rhadinorhynchus johnstoni* Golvan, 1969
Rhadinorhynchus pristis: Johnston & Edmonds, 1947a: 17-19.
Rhadinorhynchus johnstoni Golvan, 1969: 73.
 Host: *Thunnus thynnus maccayi* (Castelnau).
 Locality: S.A.

25. *Serrasentis sagittifer* (Linton 1889)
Echinorhynchus sagittifer, Linton 1889: 494.
Serrasentis socialis: Southwell & Macfie 1925, 160; Johnston & Deland, 1929a: 152.
Serrasentis sagittifer: Van Cleave, 1924: 326; Hooper, 1983: 21-22.

Paratenic hosts: *Platycephalus bassensis* (Cuvier), *P. arenarius* Ramsay & Ogilvy, *P. richardsoni* Castelnau, *P. fuscus*, Cuvier.
 Locality: Q., N.S.W.

Centrorhynchidae

26. *Centrorhynchus asturinus* (Johnston, 1913)
Gigantorhynchus asturinus Johnston, 1913: 93.
Centrorhynchus asturinus (Johnston, 1913: 215).
Echinorhynchus hazue Southwell & Macfie, 1925: 177-178.
Porrorchis falconis Johnston & Best, 1943: 229-230, Fig. 18.
Centrorhynchus falconis Yamaguti, 1963: 123.
 Hosts: *Accipiter cirrhocephalus* (Vieillot), *A. fasciatus* (Vigors & Horsfield), *A. novaehollandiae* (Gmelin), *Aviceda subcristata* Gould, *Falco berigora* Vigors & Horsfield, *F. cenchroides* Vigors & Horsfield, *Circus approximans* Peales.
 Localities: N.T., Q., N.S.W., V., S.A.

27. *Centrorhynchus bancrofti* (Johnston & Best, 1943)
Gordiorhynchus bancrofti Johnston & Best, 1943: 226-228, Figs 9-16.
Centrorhynchus bancrofti Yamaguti, 1963: 121.
 Hosts: *Ninox novaeseelandiae* (Gmelin), *Ninox strenua* (Gould).
 Localities: Q., N.S.W., S.A.

28. *Centrorhynchus horridus* (Linstow, 1897)
Echinorhynchus horridus Linstow, 1897: 281-291.
Centrorhynchus horridus: Meyer, 1932: 119-120; Johnston & Edmonds, 1948: 70.
 Hosts: *Halcyon sancta* Vigors & Horsfield, *Dacelo novaeguineae* (Hermann).
 Localities: Q., N.S.W.

Plagiorhynchidae

29. *Plagiorhynchus charadrii* (Yamaguti, 1939)
Prosthorhynchus charadrii: Yamaguti, 1939:
 316-361; Johnston & Edmonds, 1947: 561-562, Figs
 25-30.

Plagiorhynchus charadrii: Schmidt & Kuntz, 1966:
 526.

Hosts: *Charadrius rubricollis* Gmelin, *C.
 ruficapillus* Temminck.

Localities: S.A., T.

30. *Plagiorhynchus menurae* (Johnston, 1912)
Echinorhynchus menurae: Johnston, 1912b: 83, Figs
 39-40.

Prosthorhynchus menurae: Johnston & Best, 1943:
 226, Figs 1-8.

Plagiorhynchus menurae: Schmidt & Kuntz, 1966:
 521.

Host: *Menura novaehollandiae* Latham.

Localities: Q., V., N.S.W.

31. *Plagiorhynchus cylindraceus* (Goeze, 1782)
Echinorhynchus cylindraceus Goeze, 1782.

Prosthorhynchus cylindraceus: Yamaguti, 1963: 152;
 Edmonds, 1982: 72-74, Figs 4-5.

Plagiorhynchus cylindraceus: Schmidt & Kuntz,
 1981: 597-598; Smales, 1988: 1062-1064.

Host: *Turdus merula* Linnaeus, *Acridotheres
 tristis* Linnaeus, *Hydromys chrysogaster* (Geoffroy),
Isodon obesulus (Shaw), *Perameles gunnii* (Gray).

Localities: V., T.

32. *Porrorchis hylae* (Johnston, 1914)

Echinorhynchus hylae Johnston, 1914: 83-84.

Echinorhynchus bulbocaudatus Southwell &
 Macfie, 1925: 178-179.

Gordiorhynchus hylae: Johnston & Edmonds, 1948:
 74-76, Figs 10-20.

Pseudoporrorchis hylae: Edmonds, 1957a: 76-77.

Porrorchis hylae: Schmidt & Kuntz, 1967: 133-135,
 Figs 5-7.

Paratenic hosts: *Hyla* spp., *Limnodynastes* spp.,
Bufo marinus.

Definitive hosts: *Centropus phasianinus*
 (Latham), *Podargus strigoides* (Latham).

Localities: Q., N.T., S.A.

33. *Porrorchis hydromuris* (Edmonds, 1957)

Pseudoporrorchis hydromuris Edmonds, 1957a:
 77-78, Figs 1-4.

Porrorchis hydromuris: Schmidt & Kuntz, 1967: 141.

Host: *Hydromys chrysogaster* Geoffroy.

Locality: Q.

34. *Sphaerechinorhynchus rotundocapitatus*
 (Johnston, 1912)

Echinorhynchus rotundocapitatus Johnston, 1912b:
 83-84, Fig. 5.

Sphaerechinorhynchus rotundocapitatus Johnston
 & Deland, 1929b: 155-166, Figs 1-34.

Host: *Pseudechis porphyriacus* (Shaw), *Pseu-
 dechis guttatus* De Vis.

Localities: N.S.W., Q., V.

Polymorphidae

35. *Arhythmorhynchus johnstoni* Golvan, 1960
Arhythmorhynchus frassoni: Johnston & Edmonds,
 1951: 3, Fig. 1.

Arhythmorhynchus johnstoni Golvan, 1960: 384;
 Edmonds, 1971: 60, Fig. 10.

Host: *Numenius madagascariensis* (Linnaeus).

Locality: Q.

36. *Arhythmorhynchus limosae* Edmonds, 1971
Arhythmorhynchus limosae Edmonds, 1971: 58-60,
 Figs 11-15.

Host: *Limosa lapponica* (Linnaeus).

Locality: Q.

37. *Bolbosoma capitatum* (Linstow, 1880)
Echinorhynchus capitatus Linstow, 1880: 49-50.

Bolbosoma capitatum: Meyer, 1932: 89; Edmonds,
 1957a: 78; Edmonds, 1987: 327.

Host: *Pseudorca crassidens* Owen.

Localities: S.A., W.A.

38. *Bolbosoma balaenae* (Gmelin, 1790)

Echinorhynchus balaenae Gmelin, 1790.

Bolbosoma balaenae: Meyer, 1932: 85; Amin, 1985:
 60.

Bolbosoma porrigens: Meyer, 1932: 85; Johnston
 & Deland, 1929a: 147.

Host: *Megaptera nodosa* Bonnaterre.

Locality: N.S.W.

39. *Corynosoma australe* Johnston, 1937

Corynosoma australe Johnston, 1937: 13-16, Figs
 8-12; Smales, 1986: 94-96, Figs 7-11, 23.

Host: *Neophoca cinerea* (Peron & Leseuer).

Locality: S.A.

40. *Corynosoma clavatum* Goss, 1940

Corynosoma clavatum Goss, 1940: 12-13, Figs
 33-38; Johnston & Best, 1942: 250; Johnston &
 Edmonds, 1952: 16-17, Figs 1-3 Hooper, 1983:
 29-30.

Paratenic hosts: *Platycephalus bassensis* (Cuvier),
P. fuscus Cuvier, *P. arenarius* Ramsay & Ogilvy, *P.
 richardsoni* Castelnau, *P. longispinis* Macleay.

Definitive hosts: *Phalacrocorax varius* (Gmelin),
P. sulcirostris (Brandt), *P. melanoleucos* (Viellot),
Leucocarbo fuscescens (Viellot).

Localities: S.A., W.A., N.S.W.

41. *Corynosoma stanleyi* Smales, 1986
Corynosoma stanleyi Smales, 1986: 92-94, Figs 1-6, 21.

Host: *Hydromys chrysogaster* Geoffroy.
Locality: T., V.

42. *Polymorphus arctocephali* Smales, 1986
Polymorphus arctocephali Smales, 1986: 97-99, Figs 12-16, 24.

Host: *Arctocephalus pusillus doriferus* (Schreber).
Locality: V.

43. *Polymorphus biziurae* Johnston & Edmonds, 1948
Polymorphus biziurae Johnston & Edmonds, 1948: 71-74, Figs 1-9.

Intermediate Host: *Cherax destructor* Clark.
Definitive hosts: *Biziura lobata* (Shaw), *Pelicanus conspicillatus* Temminck, *Threskiornis aethiopica* (Latham), *Platalea flavipes* Gould.
Localities: S.A., T., N.S.W.

44. *Polymorphus cetaceus* (Johnston & Best, 1942)
Corynosoma cetaceum Johnston & Best, 1942: 250-252, Figs 1-10.
Polymorphus cetaceus: Schmidt & Dailey, 1971: 137.

Hosts: *Delphinus delphis* Linnaeus, *Tursiops truncatus* (Montague).
Locality: S.A.

Class EOACANTHOCEPHALA

Neoechinorhynchidae

45. *Neoechinorhynchus agilis* (Rudolphi, 1819)
Echinorhynchus agilis Rudolphi, 1819.
Neoechinorhynchus agilis: Van Cleave, 1919: 250; Yamaguti, 1963: 18; Edmonds, 1982: 75-76, Figs 7-8.

Hosts: *Crenimugil crenilabis* (Forsk.) *Mugil cephalus* Linnaeus.
Locality: Q.

46. *Neoechinorhynchus aldrichettae* Edmonds, 1971

Neoechinorhynchus aldrichettae Edmonds, 1971: 55-58, Figs 6-9.

Host: *Aldrichetta forsteri* (Cuvier & Valenciennes).
Locality: S.A.

47. *Neoechinorhynchus magnus* Southwell & Macfie 1925
Neoechinorhynchus magnus Southwell & Macfie, 1925: 149.

Host: unknown fish.
Locality: Q.

The only record is that of 1925. Edmonds (1982: 74) re-examined the holotype and found it to be a defective specimen. He considered it a *species inquirenda*.

48. *Neoechinorhynchus tylosuri* Yamaguti, 1939
Neoechinorhynchus tylosuri Yamaguti, 1939: 347; Edmonds, 1982: 74-75, Fig. 6.

Host: *Tylosurus* sp.
Locality: Q.

OTHER RECORDS

1. *Echinorhynchus gadi* Zoega was reported from 'haddock' in Queensland by Southwell & Macfie (1925: 179). Johnston & Deland (1929: 153) reported that *Gadus* does not occur in Australia and considered that the record 'should be omitted from the Australian list'.

2. Hall (1974) listed some birds from which the cysts of *Oncicola pomatostomi* had been obtained. The information is included in the list given on page 128.

3. The record of *Mediorhynchus garruli* given in Mawson *et al.* 1982 is doubtful. The record came from the Commonwealth Institute of Health, Sydney but no specimen was available for checking.

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‘WHAT ABOUT SELF-DETERMINATION?’ THE DAA AND ABORIGINAL DRINK REHABILITATION PROGRAMS

L. SACKETT

Summary

Focusing on Aboriginal drink rehabilitation programs in Adelaide, South Australia, this paper examines the two-edged nature of the self-determination/self-management policy. Blacks use it to construct claims and make demands. At the same time it serves the state. To assist groups and organisations, government allocates funds, but on a competitive basis. This creates and maintains divisions in the recipient Aboriginal population, leading to squabbling and ‘politicking’ between rival bodies. The infighting makes it appear as though Blacks are incapable of getting ‘their act together’. Moreover, it establishes the conditions and justification for continued state intervention; Aborigines must be ‘helped’ until such time as they are able to operate unaided.

'WHAT ABOUT SELF-DETERMINATION?' THE DAA AND ABORIGINAL DRINK REHABILITATION PROGRAMS

L. SACKETT

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Focusing on Aboriginal drink rehabilitation programs in Adelaide, South Australia, this paper examines the two-edged nature of the self-determination/self-management policy. Blacks use it to construct claims and make demands. At the same time it serves the state. To assist groups and organisations, government allocates funds, but on a competitive basis. This creates and maintains divisions in the recipient Aboriginal population, leading to squabbling and 'politicking' between rival bodies. The infighting makes it appear as though Blacks are incapable of getting 'their act together'. Moreover, it establishes the conditions and justification for continued state intervention; Aborigines must be 'helped' until such time as they are able to operate unaided.

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One might be forgiven for thinking the twenty-one years since the 1967 Referendum mark the coming of age of Aboriginal-state relations in Australia. Certainly this is widely acclaimed and generally accepted as a period of tremendous change. It began with the Federal Government, backed by a huge majority of the country's citizenry, moving to assume overall responsibility for the well-being of the nation's indigenous population. Following this the 'hodge-podge' of assimilationist and integrationist policies and practices were scrapped, to be gradually replaced by a collection of more innovative, Welfare State initiatives. These include implementing Aboriginal legal aid programs, Aboriginal health organisations, special Aboriginal educational and training grants, Aboriginal housing projects, Land Rights, economic improvements and so forth.

Government maintains that its support of these measures has been and remains primarily assistive, aimed at counteracting the history of injustices and facilitating Aboriginal self-determination and self-management. The idea behind this strategy is that with the proper kind of aid, Aborigines, as individuals, organisations and entire communities, will be well-placed to make decisions on their own behalf about their future (see 'Aboriginal Affairs Background Notes: Aboriginal Self-Management' 1983). The days of outsiders intervening in and directing Aboriginal affairs supposedly are almost over. That they are not quite at an end stems, in part at least, from the fact that, as many Whites remark and many Blacks readily admit, group after group is riddled with gossip and rife with 'politicking'. As part of this there is divergence of thought and infighting concerning the direction people should take, the best road to travel and the most proficient driver. From the administrative viewpoint this lack of unity — this, as one

government employee put it, 'manifestation of the Aborigines' inability to get their act together' — provides the rationale or justification for continued (allegedly reluctant) intervention by outsiders in Aboriginal affairs. Aborigines must be helped until such time as they overcome their differences and are in a position to cope on their own.

But is the policy in practice so benign and enabling? As researchers like Offe (1972) and Galper (1978) have observed, although it is undoubtedly the case that some recipients of government largesse would be even worse off than they are had the ameliorative steps not been taken, the moves themselves impose new problems. In Australia these arise from the fact that while the kind of aid currently provided does constitute a new surface configuration in the ongoing Aboriginal-state assemblage, the underlying structure of associations stands unaltered. Non-Aboriginal society in general and the state in particular, remain in control; the regulation of money having replaced oppressive laws and blatantly paternalistic treatment as the exclusive manipulative mechanism. In this, again as Galper has noted, the allocation of (limited) revenue on an essentially competitive basis i.e. the manner said to be the fairest (and most democratic), is by its very nature divisive.

This means that at the same moment government seeks to promote community it simultaneously generates discord and enmity. That is, the divisions and disputes are not pre-existing, surmountable, nuisances; rather they are creations of the overall developmental scheme (see Beckett 1987, Howard 1982, Sackett n.d.). So if Aboriginal people are in some sense inherently 'better off' than they were (with somewhat more of the nation's wealth now flowing their way), their corresponding heightened dependence on state patronage militates against the possibility they may know the type of solidarity

which would cause the state to cease directing Aboriginal affairs. Simply put, Aborigines are caught in a vortex wherein what is perceived as a lack of unity and consequent inability to direct their own affairs, the product of previous unremitting government interference, 'necessitates' further intervention. Such a 'no-win' situation is clearly shown by the predicament faced by Nungas (Aboriginal people) working in drink rehabilitation programs in and around Adelaide, South Australia.

BACKGROUND

The original inhabitants of what is now the Adelaide area were introduced to intoxicating beverages even before the official founding of the Colony of South Australia in 1836. Sealers, whalers and intending settlers are reported to have used alcohol in; among other things, their negotiations with Blacks — the aim frequently being to secure Aboriginal women as sexual partners. The establishment of Adelaide town brought about an increase in the incidence of such transactions (Berndt & Berndt 1951: 67). But if a number of individuals sought to profit in this manner, at least a few influential Europeans perceived both personal and social costs. These people soon began expressing concerns about what they interpreted as a conjunction of Aboriginal drinking and drunken disorder, prostitution, bothersome begging, unsightly fringe camps, and the like (see contemporary issues of the 'South Australian Gazette and Colonial Register'). This not only served to contribute to the most widespread and enduring of Aboriginal stereotypes, that of the Aborigine as a problem drinker, it also supplied a reason for the direct involvement of Whites in the lives of local Aborigines.

The authorities' initial and, as it happens, long-lasting reply was to, in 1837, impose a prohibition upon the supply of liquor to Aborigines (Gale 1972: 59). This was later coupled with a set of sanctions directed at those Black men and women found in possession of such liquor. Aborigines, both for their own good and for the well-being of society as a whole, needed to be controlled; in large part through being 'protected' from what were 'obviously' potentially deleterious items. Although these moves combined to form only one of the many types of discriminatory legislation levelled at Aborigines over the years, they neatly summarised the state of play between them and a number of colonial and post-colonial administrations. While the various licencing laws operated to confirm and reconfirm the European view of Aborigines as a people incapable (owing either to genetic or cultural factors) of handling alcohol (and, more generally, other products and features of European

civilisation), they did little to stem the flow of the banned liquid (Berndt & Berndt 1951: 68; Millar & Leung 1971: 92). At the same time, the impediments, by denying Aborigines free access to a commodity widely, openly and routinely enjoyed by Europeans, not only marked and maintained a social distance between Whites and Blacks, they incensed the latter.

Eventually, in the immediate pre-World War II period, this less than effective approach was amended. Under the new arrangements South Australian Aborigines were offered inducements, the possibility of unrestricted access to alcohol among these, to modify certain of their behavioural patterns, abandon others and by-and-large adopt a Western-oriented life-style. Those judged to have passed muster were exempted from the provisions of the special acts, enabling them legally to enter precincts formerly exclusive to the non-Aboriginal community — especially the previously off-limits bars of public hotels. But just as prohibition and punishment had failed to halt Aboriginal drinking or resolve the 'problems' associated with Aboriginal alcohol consumption, so the selective granting of privileges was found wanting. In fact the alterations, rather than redressing the prevailing situation, further complicated matters. The relatively few Aborigines awarded 'citizenship' had many relatives who remained wards of the state — unable to purchase liquor¹. These kin, rather than continue transacting in procuring and intercourse or paying exorbitant prices to Whites for illicit alcohol, began prevailing upon their more fortunate relatives to purchase it on their behalf. Needless to say, this frequently brought those with rights to the attention of the police and led to them spending periods in gaol².

Recently a succession of South Australian State Governments have moved to strike from the statutes all edicts recognised as disadvantaging Aboriginal people, including those covering liquor³. Surprisingly, this apparent change of course was not the product of (nor has it generated) a reassessment of the entrenched belief that Aborigines have a drink problem. On the contrary, for most Whites the present unobstructed availability and occasionally very public use of liquor by a portion of the Aboriginal community merely demonstrates that Blacks have yet to come to terms with drink. But if a 'problem' remains, its cause has been redefined; at least at the official level. For example, the Honourable Clyde Holding, when Federal Minister for Aboriginal Affairs, remarked that heavy drinking and drunkenness on the part of Aborigines must be regarded 'as the symptom of deeper problems', such as the 'effects of dispossession . . . the extreme disruption of Aboriginal society . . . poor housing and low self-esteem'. We

need to attack these, he said, not 'opt for the easy solution, of blaming the victim' (1984: 11). Commonwealth and South Australian administrations not only have set out (in their own way) to do battle with the underlying causes, they have gone on to underwrite measures designed to help Black people overcome more immediate difficulties they may face with drink.

THE ADELAIDE ABORIGINAL DRINK REHABILITATION ARENA

Subsidised and self-sustained treatment and support facilities for drinkers had operated for some time around Adelaide, as they had in other Australian cities. However, from the point of view of both Aborigines and White bureaucrats and social workers these all shared a critical shortcoming. None of them were particularly sympathetic to the needs of the minority Black population. Aborigines were said, and themselves claimed, to feel socially excluded in gatherings organised and attended almost exclusively by Whites ('Conference on "Drink Related" Problems Amongst Aboriginal People' 1975: Appendix A; Aboriginal Resources Division n.d.: 10). It was even suggested that Alcoholics Anonymous (AA), the Salvation Army and the like, with their continual references to and weighty reliance upon the Christian deity, were antithetical to Aboriginal culture, including that of urban Blacks. What was needed was 'Aboriginalisation', at the level of personnel *and* approach.

The first formal steps in this direction were taken in the latter half of 1972 by the South Australian Department for Community Welfare (DCW) when, with the strategy shift by Aboriginal Affairs and accompanying marked increase in the availability of funds, it sponsored a research project on 'Aboriginal alcoholism'. The results of this investigation not only 'confirmed' that Blacks indeed were alienated from existing services, they highlighted the fact that one organisation — the Adelaide Central Mission (ACM) — indicated a willingness to adapt its programs to meet the needs of Aboriginal people ('Conference on "Drink Related" Problems Amongst Aboriginal People' 1975: Appendix A). The ACM, with headquarters near the heart of the city, maintained a drop-in centre it called the Crypt, where street people could get out of the cold or rain, have a cup of coffee and, if so inclined, seek aid and advice from welfare workers. As this was the only place of its type, and because little reformist pressure was put on users, a large number of people, including a few Aborigines, passed through its doors. That some members of what had come to be designated as a

shockingly needy section of Australia's most deserving group used a facility run by a body expressing a preparedness to address the special requirements of that group, led to the ACM quickly being singled out as a potential conduit for relief.

By the early months of 1973 the ACM, aided by government money, had employed an Aboriginal man who had just completed a nine-month stay at its recuperative colony in the Adelaide Hills. He, alone or in the company of an Aboriginal employee of the Prisoners' Aid Association, regularly visited the local gaol, parks and squares, encouraging people to abandon drink and their 'wasteful' drunken life-style. Additionally, these two, plus two non-Aborigines, one from the ACM and the other from the DCW, began devising a rehabilitation program they hoped would mesh with the Aboriginal socio-cultural system (Aboriginal Resources Division n.d.: 13). The expectation was that this would be tested and, where necessary, extended or transformed as other Aborigines who had been consumed by the the quest for liquor used it as a vehicle to 'attain sobriety'.

A promising extension of these Aboriginalisation efforts occurred later in 1973 when the reformed drinker from the ACM joined with a few other Nungas to begin the Aboriginal Sobriety Group (ASG). This body, modelled roughly on AA, first assembled wherever Aboriginal drinkers gathered. Later it came to hold regular weekly meetings at the Aboriginal Community Centre. At these the five, to ten, to twenty, or so in attendance would talk through their drink histories, discuss the devastating effects alcohol had had and was having on Aborigines' lives and Aboriginal culture, and mutually encourage one another to continue resisting the temptations of liquor (see Leary *et al.* 1975: 21; Coaby 1976: 96; Milera 1980: 15-18; Sumner 1984: 33).

Begun as an aspect of one campaign, the ASG, or at least a segment of the group, soon determined to go its own way. With the Government's new liberal approach offering a ripe opportunity to continue expanding the provisions and facilities for Aborigines interested in getting off the grog, some regulars sounded out or were sounded out (the details are unclear) by the authorities on the possibility of the ASG getting funds to open a hostel and institute a totally Aboriginal-controlled scheme. Having positive indications in hand, they put it to their fellow members that if drink rehabilitation was to be truly Aboriginalised, then (in line with both grassroots demands and public policy) Aborigines alone, not Whites and Aborigines, should be making all plans and decisions. That is, it was necessary to step beyond the essentially ACM-patronised frame. Further, the ASG should and could lead the way in this pursuit.

While this news proved popular with the majority, it perturbed those most closely associated with the ACM. The latter responded by both defending the involvement of whites and issuing warnings concerning what they claimed was the rhetoric of 'educated' Blacks (i.e. the kind of talk supposedly emanating from those supporting the proposition and said to be characteristic of people having little familiarity with, or little in common with, the bulk of Aboriginal people). When it became evident these rejoinders were falling on hostile ears, the ACM supporters departed.

The emergent rift between Aborigines linked to the ACM and those involved in the ASG, which at the time was attributed to simple personality clashes, caused immediate concern. There was a real worry that those confronting a pressing issue would end up bickering over methods, and thereby be diverted from their urgent task. Indeed, it was soon being said that the programs of the two organisations actually were working against one another ('Conference on "Drink Related" Problems Amongst Aboriginal People' 1975: 2 and Appendix A). This, plus the growth of rehabilitative developments in South Australian country areas, sparked calls for mediation. A report by the DCW Aboriginal Resources Division (undated, though produced during 1973-74), for instance, recommended the:

development of an overall strategy for the treatment of Aboriginal alcoholism through the medium of a two day seminar attended by representatives from all bodies who have contact with Aboriginal alcoholics (n.d.: 32).

and

the establishment of an 'Advisory Committee on Research into Aboriginal Alcoholism' to undertake and direct epidemiological, psychological, sociological and philosophical research, to offer direction to preventive and treatment orientated agencies in the development of programs, and to co-ordinate research material obtained from overseas and interstate programs (n.d.: 32).

The resulting convocation of December 1975 formed the Woma (said to mean 'bad drink') Committee, made up of, among others, representatives from the various Aboriginal drink rehabilitation programs operating throughout the state. The idea was that this overarching council would control the flow of funds from government to its constituent parties. It was expected this in turn would give the body the power to coordinate all Aboriginal drink rehabilitation activities and thereby prevent dissension and unnecessary duplication. Such a representative forum also would

be ideally placed to marshal and proffer compelling arguments for additional funding, with the result that the entire endeavour would expand and evolve. Indeed, the Department of Aboriginal Affairs (DAA) representative bluntly stated that her organisation 'did not want to support individual groups but rather to see a unified and coordinated approach' ('Conference on "Drink Related" Problems Amongst Aboriginal People' 1975: 2).

Following its birth, the Committee quickly succeeded in gaining DAA support. This money went towards creating and maintaining the Woma Secretariat, a unit of four permanent staff whose purpose — in line with the aspirations behind Woma's origin — was twofold. On the one hand, it was to constitute an administrative centre, liaising between Government and the many rehabilitation operations, arranging Woma Committee meetings, taking minutes, distributing information, disbursing finances, and so forth. On the other hand, the Secretariat was to be something of a resource centre. It was to run surveys, evaluate programs, collate data, set up training schemes, make manpower suggestions etc. (see *S.A. Woma Newsletter* 1979: 8).

While Woma, through its Secretariat, did seek to function as a pressure group (Smith 1976: 108), it never became the granting and regulating body its founders envisaged. From the outset its annual funding only ever covered its own ongoing wages and travel expenses. Consequently, its employees were never able to intervene in the operations of the various rehabilitative efforts. That is, they could never execute many of the duties they had been hired to perform. They lacked the 'clout' to do so.

Having prodded people into fashioning Woma, the government of the day declined to assent to its funding scheme. It responded in this manner because it found itself caught in a bind as to how to proceed, not simply in the drink rehabilitation arena but in Aboriginal affairs more generally. Just as it wanted to be seen to be enabling Aboriginalisation it also had to appear responsible, especially in regard to its constituents' tax dollars. Granting money to organisations like Woma could be advertised as being in tune with the first objective; it also, as the state was discovering, could be interpreted as being out of harmony with the second. At the same time government was sponsoring the composition of Woma, it was coming under increasing criticism from non-Aborigines over the apparent lack of accounting procedures in its funding of Aboriginal projects. Stories of wastages and misappropriation were common (see Howard 1979: 11-12). To both rectify the situation and protect itself, the DAA implemented stringent guidelines about grant disbursements. These, among other things, endorsed direct funding procedures; which, when

put into practice, struck at the very fabric of those bodies (like Woma) that sought to be intermediate agents in the distribution process.

Furthermore, in the wake of Woma's emergence, questions concerning its pertinence were raised. Some of these were voiced by the medical director of the state's Alcohol and Drug Addicts Treatment Board (the Board). He argued that the creation of a (separate) management and instructional body for Aborigines was wasteful in that it duplicated services already offered elsewhere. More dangerously, such fragmentation (along racial lines) weakened what needed to be a strong, collaborative arrangement (*The Advertiser*, 31 January 1976: 17).

The criticisms aired initially by the Board's medical officer were amplified by other non-Aboriginal bureaucrats into a major attack. This for the most part focused in on an alleged disparity between Woma's role and its accomplishments. One report, for instance, noted that:

the Adelaide Central Mission adopts a professional approach in providing an effective program of services (Oakes & Drew 1981: 29)

and

the ASG provides an effective program of services (Oakes & Drew 1981: 28).

However, the report also indicated that Woma's personnel not only had been woefully unsuccessful in promoting inter-group communication, they lacked expertise in alcohol-related issues and, concomitantly, were neither qualified nor 'competent to objectively assess the relative needs' of the various programs (Oakes & Drew 1981: 33). In the end the document counselled that the 'Alcohol and Drug Addicts Treatment Board . . . would be the appropriate agency to undertake' the necessary tasks (1981: 35), and that such an arrangement 'would not require the continuation of the . . . State Woma Committee' (1981: 36).

This being the case, it is not surprising that in the years following the inauguration of Aboriginal drink (and drug) rehabilitation activities around Adelaide, ACM and ASG endeavours burgeoned while Woma withered. These divergent evolutionary lines can be seen immediately by examining funding levels of the three relative to one another. In 1977-78, the first period in which the three were all fully operational, ACM was granted \$63 916 (44.5%), ASG \$13 000 (9%) and Woma \$66 849 (46.5%) of the \$143 765 allocated to programs serving the metropolitan area. By 1983-84, the last time all three functioned, ACM received \$106 265 (44.35%), ASG \$71 940 (29.2%) and Woma \$65 134 (26.45%) of the total of \$244 339.

The ACM used its grants to employ five Aboriginal counsellors or welfare officers. They, along with about an equal number of non-Aboriginal workers, operated from a day centre situated near one of Adelaide's most popular drinking squares. Besides having a presence in this square and the nearby parklands, attending the Adelaide Magistrates Court, and simply being on hand and visiting Aboriginal (and non-Aboriginal) men and women who came into the centre, the workers advised people who expressed an interest in 'sorting out their lives'. Where appropriate they made arrangements for people to go through an initial detoxification and on to either the Mission's colony in the Adelaide Hills or the Nunga Farm, a facility operated by the Lower Murray Nunga Club. In addition to maintaining contact with clients at these more distant locations, the workers sought to call on them in their homes when they eventually returned to the city.

The ASG, also on DAA money, was based in the Aboriginal Community Centre. From here a staff of five or six operated a soup kitchen, ran a recreation club for children, supervised involvement in Black netball and football teams and dealt with people who requested assistance. In accordance with the organisation's guiding philosophy, ASG personnel viewed themselves as a support group — not as providers of treatment. As such they continued to hold regular meetings. Furthermore, like the Aboriginal workers at the ACM, ASG employees helped people gain entry to detoxification and more lengthy rehabilitation programs. The group also, in conjunction with Aboriginal Hostels Ltd, maintained three residences: an overnight shelter for people 'still on the grog' and two 'dry' houses (one for men and one for women) for those learning how to live without alcohol (cf. Sumner 1984).

The Woma Secretariat was also situated in the Community Centre. In contrast to ACM and ASG staff, however, the two Woma employees toiled virtually full-time on administration, leaving the office only to visit government departments, attend meetings etc. Their complete lack of contact with drinkers exposed them to criticism from those workers who saw themselves as existing on the extremely wearing and frequently very messy front line of welfare assistance. This Aboriginal censure of Woma ultimately was wielded with telling effect by government.

'SELF-DETERMINATION' IN THE DISTANCE REHABILITATION AND WELFARE

While the authors of the growing body of published and unpublished observations critical of

the role and operation of Woma and its Secretariat, canvassed Aboriginal views on the organisation, these were neither reported nor used to support conclusions and recommendations. Rather, the findings cited 'objective' factors such as a supposed lack of paper qualifications of staff and an overall poor cost effectiveness of the unit. Perhaps they proceeded as they did because Aboriginal disapprobation of Woma, like the remarks ACM and ASG members were said to have made about each other earlier, ordinarily were couched in terms of what was regarded as personalities, not in terms of structures or operational issues (*cf.* Beckett 1987: 200). Those in or associated with the different programs regularly indicated to one another, to DAA personnel, to investigators and interested outsiders, that the capacities of the Woma retinue should at best be regarded as a joke. A more serious critique was that funds directed towards the Secretariat were being totally squandered; they were not being invested so as to produce any conceivable return. The Secretariat was supposed to be 'an umbrella, covering all organizations'. But the various sub-structures 'remain[ed] quite independent'. It was asserted the people on the Secretariat 'dressed real sharp, worked behind their desks from eight to five and never ventured near the squares or pubs'. One Nunga put it in a nutshell when he said they were 'underemployed, sitting around doing a little bit of paper work', while ACM and ASG were 'trying out for help' (i.e. in urgent need of additional staff).

Whatever the case, the absence of any obvious Aboriginal input into the bureaucratically-originated deprecations of Woma allowed Blacks to argue that such criticisms failed to reflect their views. Thus, to follow any suggestions embodied in the appraisals would weaken the new powers of self-determination. This claim permitted people to resist any endeavours to place Aboriginal drink rehabilitation activities under the authority of the Board. Such a move, they said, would be a retrograde one. It would both go against the notion of Aboriginalisation and eat into what was accepted as recently-gained autonomy.

This stalemate continued through to mid-1983, when the DAA commissioned yet another examination of all Woma operations. Personnel from the ACM and ASG later claimed they had requested something along these lines. The DAA, with a long list of complaints from Aborigines concerning Woma, could be interpreted as (and actually indicated it was) responding to Aboriginal demands. The investigator, a non-Aboriginal woman working for the Board, started from the conclusions Oakes & Drew (*op. cit.*) had reached two years earlier: that the Woma Committee (and Secretariat) be disbanded and the Board take over

both the training of Aboriginal workers and coordination of the various Aboriginal drink rehabilitation exercises. She (Walsh 1983, 1984), like researchers before her, discovered that Aborigines involved in drink rehabilitation activities from throughout the state were deriding Woma. Moreover, she included some of their remarks in her report. She quoted people as being against the body because '(t)he Chairman lived too far away'; 'the State Committee didn't meet enough'; and it 'acted as boss, not an employee' (Walsh 1984: 17). In a similar vein she noted that people alleged they had 'lost faith in the Secretariat'; that 'personality reasons led communities to separate from the Secretariat'; and it needed 'to be restaffed' (Walsh 1984: 19). At the same time interviewees were said to be very much in favour of some type of program of formal vocational education. As one person declared, '[t]raining is a must . . .' (Walsh 1983: 5). The support for a proposed teaching unit was completely consistent with the criticism of Woma. This was precisely the area where Woma reputedly had let rehabilitation workers down¹.

Curiously, although Walsh highlighted Aboriginal gibes at Woma, such sniping was by no means directed exclusively at the Secretariat, nor was it confined to drink rehabilitation endeavours. On the contrary, it radiated out to include the DAA, Aboriginal Legal Aid, the Aboriginal Task Force, Offenders Aid and Rehabilitation Service, the Department of Social Security, and so on. It was simply particularly concentrated within the drink rehabilitation arena. For example, it was said the ACM Aborigines really had no consolidated campaign. Sure, they were seen around the parks, but what else did they do? The view was that they (depending on the exigencies of available 'bed' space instead of individual needs) sent clients here and there, did not run a support group for ex-drinkers, and so forth. It was held that they actually were constrained from doing much that was 'constructive'. The DAA granted money to the ACM, basically a White-run organisation. Even the most senior of the Aboriginal staff worked under and took orders from a White, to the extent that Aborigines supposedly had to seek permission from non-Aborigines to use a car purchased with DAA funds. Worse yet, the ACM was, when all was said and done, a Christian mission. As one observer noted, re-calling memories from the recent history of Black-White relations, such organisations strived towards White goals and served to maintain Aborigines as subservient. At least one exhortation was that the DAA must not even consider sustaining so compromised a group, but should divert all money going to the ACM to the ASG, 'where Aborigines would control it and derive some benefit from it'.

The ASG, for reasons not unlike those put forward in conjunction with the ACM, also was said to lack a coherent program. Indeed, it was alleged that sometimes, instead of coping with problems, ASG members rang the Aboriginal staff at the ACM for advice and assistance. In addition, ASG members were labelled 'secretive', 'nepotistic' and 'uncooperative'. However, the most persistent and damning indictment revolved around ASG's alleged lack of prominence in the community. Comments were that, 'You just don't see them around', and that they spend all (or at least too much of) their time 'sitting in the office, waiting for people to come to them'. The result, it was suggested, was that street people had little or no knowledge of ASG facilities. Why did ASG workers ensconce themselves in this manner? The reply was that they were more interested in 'empire building than in the people they [we]re supposed to be dealing with and serving'. They saw 'their job simply as trying to get more money'. Consequently, they needed 'looking into' i.e. funds earmarked for ASG would be better spent elsewhere.

Although the comments reported by Walsh consistently scorned Woma, they were more discordant when it came to prescriptions for change. Some were noted as favouring the remoulding or reconstituting of Woma in such a way as to overcome past problems and meet emergent needs (Walsh 1984: 5). This would allow groups to remain independent (as they had become 'under' Woma), both of overarching authority structures and of one another, and to decide their own further education. Others advocated placing the various groups within the folds of a larger fabric, like the Board or the Aboriginal Health Organisation, which would oversee activities and schooling (Walsh 1984: 5). It was also claimed that those holding the latter type of view were under extreme pressure from people maintaining the former position to step beyond their limiting stance and join in opposing retrograde action (Walsh 1984: 7-8). Such findings permitted the investigator to recommend that:

... the present State Committee structure no longer continue in its present form and employees of the Woma Secretariat be found alternative employment ... (Walsh 1984: 1)

Additionally she recommended:

that the Aboriginal proposal for an independent Training and Resource Unit for the education of Aboriginal alcohol workers be accepted and achieved over a three year period (Walsh 1984: 1)

But she proposed:

... that the Alcohol and Drug Addicts Treatment Board be contracted to employ and administer an interim education team to oversee the three year transition to independence (Walsh 1984: 1)

Remarkably, it was some months before Aborigines from the ACM, ASG and Woma Secretariat were allowed to see the completed document. A staff member of the Secretariat indicated that her repeated requests to DAA for a copy of the so-called Walsh report consistently had been met with the same reply: that the recommendations were still being considered and in any event the drink rehabilitation people knew its contents as it was based on their views and ideas. Needless to say, this secrecy operated to make the findings the subject of intense speculation. It also aggravated the level of bitterness between groups. During the long period of uncertainty, people, using the tools of invective and innuendo, sought to ensure that they were immune to criticism — through doubly disparaging the labours of others. However, at the same time the fissures between groups were being deepened, a consensus of betrayal developed. It was asserted that the report had been 'commissioned by the community' i.e. requested by Aboriginal people directly involved in drink rehabilitation programs, but instead of being presented to community representatives had been (wrongly) sent to the DAA.

When the review eventually was released in July 1984 it got a swift and sour reception — from ACM and ASG workers as well as Woma staff. Representatives from each of these bodies quickly gathered to discuss the report's features and implications. Those at the centre of the turmoil, continuing a strategy adopted some years previously, attributed their many difficulties to government miserliness. They claimed they always had been hamstrung by government funding arrangements. These not only prevented the Committee and its Secretariat from doing what they were supposed to do, they placed 'Aboriginal people and communities in the position where by (sic) they [we]re divided by the decisions of the Dept. of Aboriginal Affairs' (letter from the President of the Woma Committee to the Federal Minister of Aboriginal Affairs, 7 November 1980; see also *Advertiser* 9 May 1981: 3). At least some ACM and ASG employees agreed that the DAA, through its financial and other policies, sought to 'divide and rule'. Significantly, all in attendance concluded that many of the Walsh report's findings were 'ridiculous and totally unsupported by data'. The Woma spokesperson adopted this line in an attempt to save the body of which she was a part. The ACM and ASG functionaries joined in; though they were not

so much concerned with the continuance of Woma as they were with preserving their own independence. The solid rejoinder was that the Walsh report reflected not the views of Aborigines and Aboriginal workers but rather those of White bureaucrats and the non-Aboriginal author. It was maintained that the inquiry should have been carried out by an Aboriginal person knowledgeable in the problems of drink rehabilitation. This being the case, those present resolved to appeal to the DAA to discuss the situation at an emergency meeting of the Woma Committee.

Personnel from the DAA foresaw little profit, either for themselves or the Aborigines concerned, in such a meeting. It was declared that the 'uproar' was groundless. Although 'people from the community' were claiming their position was not truly represented, as was 'amply demonstrated' in the report itself, they had been consulted. For years they had complained about Woma. Now that these complaints were being taken seriously they began raising objections. The DAA, it seemed, had decided to act in line with the report's recommendations — at least as far as these related to the dismembering of Woma and locating programs under the aegis of the Board.

For a time the Aboriginal workers confined themselves to lobbying against the mooted takeover. When their efforts to move DAA officials failed they proceeded to more concerted action. In late September 1984, they convened a two-day conference of the Woma Committee. The first day of this was spent venting anger and debating plans of action. Were the Secretariat's days really numbered? If so, should they allow the ACM, ASG and others, to become part of the Board, or should they seek to be merged with the Aboriginal Health Organisation? What consequences would these and other possible arrangements have for local autonomy? These discussions proceeded in something of a vacuum, however. No one from the DAA was in hand — to state the department's position, comment on options being screened, indicate funding potentials etc. This perceived slight produced further consternation. So much so that a number of those present argued that all in attendance should march on the offices of the DAA and 'demand an accounting'. In the end this prospect, conveyed by telephone to the DAA, was enough to win the pledge of government representation on the following day.

The second session began with the promised emissary telling the meeting that his department, acting upon complaints and recommendations with which everyone was familiar, had resolved that 'as of 30 September the Secretariat's funding stops'. Following this brief announcement the floor was opened to questions, not discussion. The decision

had been made. The Woma Committee could not change this; although its members were free to ask how this would effect their respective programs. The immediate and only question raised was 'what about self-determination?' In elaboration it was charged that the judgement had been made not by 'the Aboriginal people', but rather 'from on high' and then passed down to Aborigines. The DAA employee did not respond to this. As he departed people bemoaned what they saw as the injustice of the situation.

WHAT ABOUT SELF-DETERMINATION?

In the hours, days and weeks following the dissolution of the Secretariat, people volunteered a range of explanations for its fate. As might be expected, these for the most part homed in on personality factors. That the people involved were unable to see or escape the fetters of the configuration in which they were embedded, and ended up 'throwing verbal rocks at one another', merely lent support to the notion that Aborigines were incapable of sorting out their differences and getting on with the job of dealing with the drink problem faced by their fellows.

No doubt it would be possible to analyse the backbiting by Nungas embroiled in the Adelaide drink rehabilitation arena in much the same way as Colson (1953) and Gluckman (1963) viewed material on gossip and scandal among the Makah Indians. Like the Makah, the Nungas operated within a context of dispossession and subjugation. Further, they too had endured heavy and sustained pressure to abandon their socio-cultural system and to conform with the beliefs and practices of the colonial and post-colonial societies in which they came to be located. And, as with the Makah, where we might expect that people 'would array themselves in unity in order to maintain their independence and identity', they ended up being 'torn by internal discussion' (Gluckman 1963: 310). But, in line with Colson and Gluckman, it could be argued that the internal strife experienced by the original Australians was (as it was for the indigenous Americans) neither as divisive nor as detrimental as first appearances would indicate. On the contrary, shared knowledge of the existence and use of disparaging comments in itself served to define and unite Aborigines. To be a member of the group one 'must be able to join in the gossip' (Gluckman 1963: 311) of that group. Conversely, outsiders could not and were not allowed to participate in the gossip network. Thus those who gossiped with and about one another constituted a cohesive unit.

However, to assess the material in this manner would be to examine it in a one-eyed fashion. It would be to discover and attribute to gossip

'important positive virtues' (Gluckman 1963: 308), and promptly rest one's case. Clearly, it is essential that we also gauge the effects and implications of extra-group factors — especially when investigating the situation of Fourth World peoples. That is, we must consider how backbiting may be generated *and* manipulated by outsiders. For if personal attacks and counter-attacks mark off and link group members in some way, they simultaneously result in people being pitted against one another — quite possibly to their collective detriment. External aspects are evident in the Makah data in the form of the state-legislated economic benefits which flowed to group members. Basically it was a case of people striving, in large part *via* the manifold mechanisms of gossip, to keep their numbers low, in order to maximise individual shares of revenue (see Gluckman 1963: 310). The Nunga case contains parallel associations between scandalmongering and competition for access to slices of a derived monetary 'pie'.

Year after year the ACM, ASG, Woma and other Aboriginal drink rehabilitation units throughout South Australia had to approach the DAA for funds to continue. As time went on, it became generally accepted, whether accurately or not, that money earmarked for rehabilitation exercises was extremely limited. In these circumstances each organisation came to regard its ability to maintain or increase its respective enterprise as dependent upon, on the one hand, the positive claims it might make for itself and, on the other hand, anything negative it might succeed in having accepted about its rivals. This two-pronged approach was particularly appropriate as none of the bodies found it possible to 'demonstrate success' in their rehabilitative efforts. Unlike Aboriginal Housing Associations, which were able to cite the purchase or construction of dwellings and consequent sheltering of Aboriginal families; Aboriginal employment schemes, which could boast about enhanced job skills and reduced unemployment figures; or even Legal Aid services, which were able to submit statistics on the way they had been instrumental in securing the 'basic human rights of Aborigines': Aboriginal drink rehabilitation programs were unable to show that their endeavours got and kept Aborigines 'off the grog'. The best they could do was to cite evidence of heavy involvement with inebriates. The ACM, for instance, required its workers to keep track of the number and type of contacts they had with clients (i.e. by storing luggage, assisting in providing medical attention, formal counselling). Similarly, ASG maintained records on the calls it made, on the travel assistance it offered, the meals it supplied, and the occupancy rates at its hostel facilities.

But providing services to people is not the same as bringing about their rehabilitation. The inability

of the various drink programs to be specific about how many people they had encouraged and enabled to 'kick' the alcohol habit, let alone the inability of any single organisation to establish that it was a more efficient and competent rehabilitator than its adversaries, did not dampen competition, it inflamed it. As Galper notes:

In the absence of objective means for setting priorities, the planning mechanisms for resource distribution establish a set of rules which govern interest-group competition. Money goes to those groups best able to compete in the political arena (1978: 15).

In this sphere ACM, ASG and Woma routinely accused one another and in turn were each accused of not deserving the funds they received. Over and over the message was one of wastages (by others), needs (of the Aboriginal community) going unmet and the like. By and large the 'brick bats' made up and thrown at ACM and ASG staff struck and helped define what seemed to be diacritic features of the two organisations. The one, in conformity with missionary traditions, appeared to proselytise while the other, in accordance with Aboriginal notions of both the acceptance of the life-styles of others and generalised hospitality, operated something of an open house. But while people questioned ACM and ASG tactics, they, like interested bureaucrats, nonetheless (even if grudgingly) allowed that these bodies in their respective, though possibly limited ways were working towards, if not a solution to, then at least an amelioration of the Aboriginal drink problem. People from the ACM and the ASG talked to members of the wider community about alcohol, befriended drinkers who either asked for or required relief and, crucially, had clients who privately or publicly recounted how they owed their lives and continued well-being to assistance received. That ACM and ASG energetically competed for the same clientele and eagerly used any information conveyed by disgruntled customers of their opponents in developing offensive critiques was frequently overlooked. Woma and its Secretariat had absolutely no clientele to turn to in order to have their praises sung (more accurately their intended clientele [ACM and ASG staff] were among their harshest detractors), making the continued criticism singularly devastating.

The State, through the instrumentality of the DAA, interpreted the intense infighting in the drink rehabilitation arena not as the product of its own enduring, interfering patronage but as evidence that Aborigines required continued external assistance. And as in the past, rather than recognising and addressing the way the prevailing Aboriginal-state relationship operated to maintain Aborigines and

Aboriginal organisations as dependent clients, staff sought to bring about change and 'progress' by here and there promoting 'new initiatives', none of which threatened the basic structure. This resulted in things being maintained much as they had been, with the state depicting itself as genuinely and generously seeking to assist Aborigines, and Aborigines seemingly unable or (perversely) unwilling to make the most of the aid being directed their way.

CONCLUSION

The history of government involvement in aspects of Aboriginal liquor use and abuse is a long one. It is also, contrary to recent rhetoric, remarkably consistent. The early protection policy sought to safeguard White interests by controlling the behaviour of Blacks. The current self-determination or self-management phase is an extension of this. Nungas can and do use it to construct certain claims and make limited demands. At the same time the state is able to continue intervening in Aboriginal activities. This is veiled by being made to look as though it is an accommodating response to Aboriginal requests; whereas actually Aboriginal claims reflect the unaltered nature of the relationship between Aborigines and the state.

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END NOTES

1. The fact that in some areas e.g. Western Australia, incentives to assimilate were officially linked with the term 'citizenship', plus the fact that what was being held out to Blacks were rights equal to those taken for granted by Whites, combined to produce a situation wherein many Aborigines used the phrases 'drinking rights' and 'citizenship rights' interchangeably.
2. For many Whites the lives of people like the Northern Territory artist Albert Namatjira and actor Robert Tudawali, men alleged to have been 'caught between two cultures', epitomise the (unintended) impact of the new approach. Both fell foul of the law for supplying liquor to kin; both were arrested on drunkenness charges; and the use and abuse of liquor by both is said to have contributed heavily towards their early deaths.
3. The last restrictions were removed in 1968.
4. See Peterson (1985) for a thought provoking interpretation of the economic conditions which underwrote this increased expenditure on things Aboriginal and the consequences it had for Land Rights.
5. This process of government sponsorship being a precursor to a chain of official enquiries (which justify various types and degrees of intervention) parallels the history of what began as the National Aboriginal Consultative Committee (Weaver 1983).
6. Allusions to the inadequate training of workers were made by bureaucrats and program employees in accounting for or explaining the 'overall lack of success' of the rehabilitation endeavour.
7. It could be argued this is not evidence of a 'failing' in rehabilitation programs, but the consequence of the absence of change at the level of the supposed underlying causes of Aboriginal drinking.

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THE SOUTH AUSTRALIAN MUSEUM'S ABORIGINAL FAMILY HISTORY PROJECT

S. J. HEMMING

Summary

As part of the South Australian Museum's responsibility to record and preserve items of Aboriginal heritage, Museum staff have been collecting photographs of Aboriginal people from as early as the end of last century – some of the photographs date from the 1860s. In the 1930s, Norman Tindale, the Museum's anthropologist, began systematically photographing Aboriginal people at different locations around the country. This was part of a larger research project funded by Harvard University and the University of Adelaide's Board for Anthropological Research. By the end of the 1950s, Tindale had not only photographed Aboriginal people from all around Australia (Table 1) but had also gathered detailed genealogies of the people in these photographs (Table 2).

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As part of the South Australian Museum's responsibility to record and preserve items of Aboriginal heritage, Museum staff have been collecting photographs of Aboriginal people from as early as the end of last century — some of the photographs date from the 1860s. In the 1930s, Norman Tindale, the Museum's anthropologist, began systematically photographing Aboriginal people at different locations around the country. This was part of a larger research project funded by Harvard University and the University of Adelaide's Board for Anthropological Research. By the end of the 1950s, Tindale had not only photographed Aboriginal people from all around Australia (table 1) but had also gathered detailed genealogies of the people in these photographs (table 2).

In the late 1970s, the Museum employed an archivist and an assistant to reorganise and store in a new archive the large collection of photographs, sound recordings, documents (including genealogies) and other materials. The Museum's archival collection is an invaluable resource relating to the Aboriginal history of South Australia and of the whole country. Over the last seven years, the Museum has given copies of its photographs to many individuals and communities, especially in the southern parts of the state. As a result, documentation relating to the photographs has often been obtained and old photographs have been given to the Museum by Aboriginal people for copying.

In the 1980s, Aboriginal people began to use the genealogies compiled by Tindale. Doreen Kartinyeri, a Ngarrindjeri historian, was the first Aboriginal person in South Australia to use this resource. By 1987, with an increase of Aboriginal interest in the Museum's resources, Tindale gave permission for photographs and genealogical information to be supplied to Aboriginal people from his unpublished material.

In 1987 the demand for access to the Museum's genealogical and photographic resources became too great for existing staff and Museum funds. To alleviate this situation, a formal project called the 'Aboriginal Family History Project' was established. The major aim of this project was to make the Museum's archival resources available to Aboriginal people.

Ms Doreen Kartinyeri was well known to the Museum at that time and her employment on the project was seen as essential. Her knowledge of southern South Australian Aboriginal families is very detailed and her familiarity with early

photographs an invaluable skill when dealing with the Museum's large collection. Ms Kartinyeri had been working towards publishing genealogies of all the southern South Australian Aboriginal families and had already published the genealogies of the Rigney and Wanganeen families. Her skills and her research plans complemented the resources the Museum had to offer the Aboriginal community. It was therefore decided to employ her as an Aboriginal Research Officer with the Museum's Aboriginal Family History Project. The Museum would provide support for her research and use her skills to upgrade the Museum's resources and make them available to Aboriginal people.

In early 1988, the Australian Institute of Aboriginal Studies provided the initial financial support to the project, enabling the Museum to employ Ms Kartinyeri for three months. However, for the Museum to meet the demand from the Aboriginal community, and to provide proper support for her research and publication program, it was decided that a research assistant and a project officer were also required. The Museum was able to fill these positions at the beginning of the 1988/89 financial year with substantial funding from the Commonwealth Department of Aboriginal Affairs.

Mr Barry Craig, an anthropologist, is now the project officer and Ms Neva Grzybowicz, who has strong links with the Koonibba Aboriginal community, is the project's research assistant. Mr Craig assists with developing publications and reports relating to the project. He also coordinates its daily running. Ms Grzybowicz assists Ms Kartinyeri and is accumulating material to publish Tindale's material from the west coast of South Australia.

There are also a number of permanent Museum staff playing significant roles in the project. They are Mr Vince Buckskin, Ms Kaye Clark, Dr Chris Anderson, Mr Philip Clarke, and myself as Project Manager. Mr Buckskin, Ms Clark and Dr Anderson assist the grant-funded staff with enquiries and Mr Clarke has devised the extensive computer databases that make the resources more readily accessible. For example, all the named Tindale photographs have now been entered onto computer and a computer index of people mentioned in the genealogies has been started. Dr Deane Fergie, working on the Museum's Lake Eyre Basin Project, is focusing on the demographic history of the region and will therefore also be contributing a significant amount of material to the Museum's Aboriginal family history data-base.

TABLE 1. Expeditions organised by Norman B. Tindale on which photographs of Aboriginal people held by the South Australian Museum were taken. BAR/SAM = expeditions by Norman B. Tindale funded jointly by the Board for Anthropological Research, University of Adelaide, and the South Australian Museum, 1932-57. HAU = expeditions by Norman B. Tindale funded jointly by Harvard University and the University of Adelaide, 1938-39. UCAU = expeditions by Norman B. Tindale, J. B. Birdsell and P. J. Epling, funded jointly by the University of California at Los Angeles and the University of Adelaide, 1952-54.

Location	Source	Dates	Number of photos held
South Australia			
1. Bookabie	UCAU	Dec. 1952	18
2. Colona	UCAU	Dec. 1952	12
3. Erliwanjawanja	BAR/SAM	May-July 1933	10
4. Ernabella	BAR/SAM	May-July 1933	110
5. Koonibba	BAR/SAM	August 1928	57
Koonibba	HAU	1938-1939	88
Koonibba	UCAU	Dec. 1952	44
6. Mirramitta	BAR/SAM	August 1934	12
7. Nepabunna	BAR/SAM	May 1937	9
8. Nullarbor Station	HAU	June 1939	6
9. Ooldea	BAR/SAM	August 1939	95
10. Pandi Pandi	BAR/SAM	August 1934	61
11. Point McLeay	HAU	1938-1939	118
12. Point Pearce	HAU	1938-1939	83
13. Poka Gap	BAR/SAM	May-July 1933	23
Poka, Mann Range	BAR/SAM	May-July 1933	30
14. Port Augusta	HAU	June 1939	15
15. Swan Reach	HAU	1938	26
16. Umbukulu	BAR/SAM	May-July 1933	17
Total			834
Western Australia			
17. Albany	HAU	April 1939	14
18. Anna Plains	UCAU	July 1953	13
19. Balgo	UCAU	August 1954	69
20. Borden	HAU	April 1939	25
21. Brooking Springs	UCAU	July 1954	4
22. Broome	UCAU	August 1953	41
23. Christmas Creek	UCAU	May 1954	83
24. Collie	HAU	March 1939	7
25. Cookes Creek	UCAU	April 1953	6
26. Cosmo Newberry	UCAU	Feb. 1953	62
27. Cundeelee	UCAU	Jan. 1953	24
28. Derby	UCAU	1953-1954	74
29. Fitzroy Crossing	UCAU	July 1954	29
30. Flora Valley	UCAU	Oct. 1953	36
31. Forrest River	UCAU	March 1954	153
32. Gnowangerup	HAU	March-April 1939	40
33. Gogo	UCAU	June 1954	60
34. Gordon Downs	UCAU	April 1954	75
35. Hall's Creek	UCAU	October 1953	21
36. Jigalong	UCAU	March 1953	76
37. La Grange	UCAU	July 1953	73
38. Laverton	HAU	May 1939	29
39. Leopold	UCAU	July 1954	19

Location	Source	Dates	Number of photos held
Western Australia			
40. Liveringa	UCAU	Sept. 1953	22
41. Mandora	UCAU	July 1953	34
42. Marble Bar	UCAU	April 1953	116
43. Margaret River	UCAU	May 1954	36
44. Meda	UCAU	August 1953	22
45. Meekatharra	UCAU	Jan. 1953	10
46. Moola Bulla	UCAU	1953-1954	295
47. Moore River	HAU	April 1939	75
48. Mount Barker	HAU	April 1939	33
49. Mount Margaret	HAU	May 1939	118
Mount Margaret	UCAU	Feb.-March 1953	91
50. Mulga Queen	UCAU	Feb. 1953	30
51. Narrogin	HAU	April 1939	15
52. Noonkanbah	UCAU	July 1954	22
53. Norseman	HAU	June 1939	27
54. Pilgangoora	UCAU	May-June 1953	369
55. Quanbun	UCAU	June 1954	15
56. Roebourne	UCAU	June-July 1953	73
57. Southern Cross	HAU	May 1939	31
58. Sturt Creek	UCAU	May 1954	94
59. Thangoo	UCAU	August 1953	14
60. Warupuju	BAR/SAM	August 1935	43
61. Wiluna	UCAU	January 1953	34
62. Wotjulum	UCAU	June-July 1954	118
63. Yeeda	UCAU	August 1953	5
Total			2775
Northern Territory			
64. Cockatoo Creek	BAR/SAM	August 1931	85
65. Darwin	UCAU	Feb.-March 1954	8
66. Granites	BAR/SAM	August 1936	38
67. Hermannsburg	BAR/SAM	August 1929	91
68. Inverway	UCAU	April 1954	59
69. MacDonald Downs	BAR/SAM	August 1930	57
70. Mount Liebig	BAR/SAM	Aug.-Sept. 1930	93
Total			431
Queensland			
71. Cherbourg	HAU	Nov.-Dec. 1938	152
72. Mona Mona	HAU	Aug.-Sept. 1938	148
73. Palm Island	HAU	Oct.-Nov. 1938	246
74. Woorabinda	HAU	Nov. 1938	140
75. Yarrabah	HAU	Sept.-Oct. 1938	267
Total			953

Location	Source	Dates	Number of photos held
New South Wales			
76. Boggabilla	HAU	July 1938	65
77. Brewarrina	HAU	June-July 1938	118
78. Cummerangunja	HAU	1938-1939	54
79. Kempsey	HAU	Dec. 1938	3
80. Menindee	HAU	June 1939	9
81. Pilliga	HAU	1938-1939	39
82. Walgett	HAU	1938-1939	2
83. Wallaga Lakes	HAU	1938-1939	23
84. Woodenbong	HAU	August 1939	62
Total			375
Victoria			
85. Lake Tyers	HAU	1938-1939	52
Tasmania			
86. Cape Barren Island	HAU	1939	129
Total number of photographs, all states			5549

The specific objectives of the project are as follows:

- to provide a computer index of names appearing in the Tindale genealogies for each locality throughout Australia.
- to establish a complete set of negatives and copy prints of the Tindale photographs. This is as yet incomplete for some states.
- to support Ms Kartinyeri's publication program, involving the publication of the genealogies of almost 40 Aboriginal families from southern South Australia. She has published three so far — the Rigney, Wanganeen and Kartinyeri families — and another five are almost ready for publication. Considerable work has already been done on the others.
- to publish Tindale's South Australian material in a form easily accessible to the Aboriginal community. Once material is published, then

the number of enquiries should be greatly reduced.

- to encourage organisations in other states to take on the project for their regions and to work towards publishing the material in an accessible form.

Access to family history information has to be provided cautiously. Information which may offend people must be identified and dealt with according to the wishes of those concerned. Aboriginal researchers with detailed knowledge of their communities are therefore essential in a project like this. A publishing program is the best way to make the edited information available and is essential to deal with the potentially open-ended nature of this project. However, publication first requires extensive consultation and Aboriginal research involvement. South Australia is fortunate to have an experienced Aboriginal family history researcher such as Ms Kartinyeri and it is hoped that a permanent position can be secured for her in the South Australian Museum.

TABLE 2. Listing of genealogies of Aboriginal people held by the South Australian Museum, and obtained on expeditions organised by N. B. Tindale. Expedition abbreviations as for Table 1.

Location	Source	Year	Volume	Page Nos	Total
South Australia					
1. Koonibba	HAU	1939	6	105-163	57
2. Nullarbor	HAU	1939	7	211-213	3
3. Point McLeay	HAU	1939	6	1-66	70
4. Point Pearce	HAU	1939	6	69-104	35
5. Poonindie	BAR/SAM	1940		1-2	2
6. Port Augusta	HAU	1939	6	164-172	10
7. Swan Reach	HAU	1939	6	104a-104j	10
Total					187
Western Australia					
8. Albany	HAU	1939	7	26-31	6
9. Anna Plains	UCAU	1953	2	203-210	8
10. Balgo	UCAU	1954	5	863-886	24
11. Borden	HAU	1953	7	19-25	7
12. Brooking Springs	UCAU	1954	5	859-862	4
13. Broome	UCAU	1953	3	254-277	24
14. Christmas Creek	UCAU	1954	4	659-697	39
15. Collie	HAU	1939	7	1-5	5
16. Cookes Creek	UCAU	1953	2	35-37	3
17. Derby	UCAU	1953	3	278-303	26
Derby	UCAU	1954	5	798-817	20
18. Fitzroy Crossing	UCAU	1954	5	828-831	4
Fitzroy Mission	UCAU	1954	5	846-855	10
Fitzroy Police Stn	UCAU	1954	5	856-858	3
19. Flora Valley	UCAU	1953	3	483-502	20
20. Forrest River	UCAU	1954	4	503-537	35
21. Gnowangerup	HAU	1939	7	6-18	13
22. Gogo	UCAU	1954	4	698-729	32
23. Gordon Downs	UCAU	1954	4	556-598	43
24. Hall's Creek	UCAU	1953	3	474-482	9
25. Jigalong	UCAU	1953	1	25-32, 62-73	20
26. La Grange	UCAU	1953	2	211-228	18
La Grange	UCAU	1953	3	229-245	17
27. Laverton	HAU	1939	7	189-196	7
28. Leopold Downs	UCAU	1954	5	832-845	14
29. Liveringa	UCAU	1953	3	324-334	11
30. Mandora	UCAU	1953	2	191-202	12
31. Marble Bar	UCAU	1953	2	1-34, 38-41	55
32. Margaret River	UCAU	1954	4	646-658	13
33. Meda	UCAU	1953	3	304-318	15
34. Moola Bulla	UCAU	1953	3	335-473	139
35. Moore River	HAU	1939	7	46-107	61
36. Mount Barker	HAU	1939	7	32-41	10
37. Mount Florance	UCAU	1953	2	182-185	4
38. Mount Margaret	HAU	1939	7	124-188, 197	65
Mount Margaret	UCAU	1953	1	33-61	28
39. Narrogin	HAU	1939	7	42-45	5
40. Noonkanbah	UCAU	1954	5	818-827	10
41. Norseman	HAU	1939	7	198-210	12
42. Pilgangoora	UCAU	1953	2	42-143	101
43. Port Headland Hosp.	—	1949-53	2	1-2	2
Port Headland	UCAU	1953	2	144-151	7
44. Quanbun	UCAU	1954	4	730-739	10

Locations	Source	Year	Volume	Page-Nos	Total
Western Australia					
45. Roebourne	UCAU	1953	2	167-181	15
Roebourne	UCAU	1953	2	186-190	5
46. Southern Cross	HAU	1939	7	108-123	16
47. Sturt Creek	UCAU	1954	4	599-645	47
48. Thangoo	UCAU	1953	3	246-253	8
49. Warupuju	BAR/SAM	1935	—	1-24	24
50. Wiluna	UCAU	1953	1	1-24	24
51. Wotjulum	UCAU	1954	4	740-797	58
52. Yandeyarra	UCAU	1953	2	152-166	16
53. Yeeda	UCAU	1953	3	319-322	4
Total					1188
Northern Territory					
54. Haast Bluff	BAR/SAM	1956-57	—	1-117, 1, 1-9	128
55. Inverway	UCAU	1954	4	538-555	18
56. Mount Liebig	BAR/SAM	1932	—	1-8	8
57. Yuendumu	BAR/SAM	1951	—	1-90	91
Total					245
Queensland					
58. Cherbourg	HAU	1918-38	4	i-xv	15
Cherbourg	HAU	1938	4	1-110	110
59. Mona Mona	HAU	1938	2	1-47	47
60. Palm Island	HAU	1938	3	1-245	245
61. Woorabinda	HAU	1938	4	1-114	114
62. Yarrabah	HAU	1938	2	1-98	98
Total					629
New South Wales					
63. Boggabilla	HAU	1938	1	1-18	21
64. Brewarrina	HAU	1938	1	1a-40	43
65. Cumeragunja	HAU	1938	1	1a-13	36
66. Kempsey	HAU	1938	5	1-2	2
67. Maloga Mission, Echuca	HAU	1879	1	43-44	2
68. Menindee	HAU	1939	6	173-179	8
69. Pilliga	HAU	1938	1	1-12	12
70. Wallaga Lake	HAU	1939	5	1-9	9
71. Woodenbong	HAU	1938	2	1-20	20
Total					153
Victoria					
72. Lake Tyers	HAU	1939	5	1-26	26
Tasmania					
73. Cape Barren Island	HAU	1939	5	1-36	37
74. Emita, Flinders Is.	HAU	1949	5	27, 29	2
Total					39
Total, all states					2467

**FOSSIL MOLLUSC TYPE SPECIMENS IN THE SOUTH AUSTRALIAN MUSEUM.
ADDITIONS AND CORRECTION TO PART 1. POLYPLACOPHORA**

The South Australian Museum collection of fossil chiton types is the largest in the southern hemisphere, and was described in detail by Gowlett-Holmes & McHenry (1988). However, a printer's error in this paper removed the first three lines of the description of the type material of *Cryptoplax sicus* Ashby & Cotton, 1939, rendering this description useless. The opportunity is taken here to correct this error, to present the description of the type material of this species in full, and to include a description of the type material of an additional species added to the collection since the publication of Gowlett-Holmes & McHenry (1988). The specimens are all individual valves, and are listed as 'complete' when the insertion plates and sutural lamina are present, or as 'incomplete' when these are missing or the valve slightly damaged. The species are arranged alphabetically in families under the original name at the time of description. For further information on the stratigraphy of these species, refer to the 'Stratigraphical Notes' in Gowlett-Holmes & McHenry (1988). The following abbreviations are used in the text: S.A. = South Australia; Vic. = Victoria.

Family **ACANTHOCHITONIDAE**
Genus **Notoplax** H. Adams, 1861

Notoplax (Notoplax) arenaria Gowlett-Holmes & McHenry, 1988.

Trans. R. Soc. S. Aust. 112(2): 81, Fig. 1.

Holotype: P12839, 1 complete median valve, from 100.9 m (331 feet), Angas Home Bore, Parafield Gardens, Adelaide, S.A., (34°47'06"S, 138°36'26"E), Dry Creek Sands, late Pliocene (Yatalan), collector unknown, 1940.

Paratype: P27904, 1 incomplete median valve, with same collection data as holotype.

Family **CRYPTOPLACIDAE**
Genus **Cryptoplax** Blainville, 1818

Cryptoplax sicus Ashby & Cotton, 1939

Rec. S. Aust. Mus. 6(3): 219, Pl. 19, Fig. 17.

Holotype: P4336, 1 incomplete median valve, from MacDonalds (Bank), Muddy Creek, Hamilton, Vic., Grange Burn Formation, early Pliocene (Kalimnan), collected by W. Greed, date of collection unknown.

Paratypes: P12829, 1 incomplete anterior valve and 1 incomplete median valve, with same collection data as holotype.

Note: The anterior valve in lot P12829 is Ashby & Cotton's (1939) 'Hypotype'.

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GOWLETT-HOLMES, K. L. & MCHENRY, B. J. 1988. Fossil mollusc type specimens in the South Australian Museum. 1. Polyplacophora. *Rec. S. Aust. Mus.* 22(1): 1-11.

K. L. GOWLETT-HOLMES, South Australian Museum, North Terrace, Adelaide, South Australia 5000, *Rec. S. Aust. Mus.* 23(2): 153, 1989.

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